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SYNOPTIC REVISIONS OF I. *LINDINGASPIS* AND II. *ANDASPIS* WITH TWO NEW ALLIED GENERA (HEMIPTERA: COCCOIDEA)

D. J. WILLIAMS

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BRITISH MUSEUM
3
NATURAL HISTORY

BY

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Pp. 1–31 ; 13 *Text-figures*

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THE TRUSTEES OF
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By D. J. WILLIAMS

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SYNOPSIS

Two new species of *Lindingaspis* MacGillivray are described and one redescribed together with notes on some other species. A key is given to 23 out of the total of 24 species now assigned to the genus.

Five species at present placed in *Lepidosaphes* Shimer are transferred to the genus *Andaspis* MacGillivray and four of these are redescribed. Descriptions of two new species are included and a key is given to all the species known at present. Two closely related genera are described as new, one of which is monotypic and the other containing two species.

INTRODUCTION

All references prior to 1956 are to be found in Morrison & Renk, 1957 : 734.

The lettering used in the figures is as follows :—A. Adult female, general aspect. B. Pygidium. C. Dorsal margin of pygidium.

I. THE GENUS *LINDINGASPIS* MACGILLIVRAY (ASPIDIOTINI)

An excellent account was given by McKenzie (1950) of the genus *Lindingaspis* which then contained sixteen species. This number included the type species, *L. samoana* (Lindinger), which is still known only from a meagre description.

Balachowsky (1953c, 1958) has since described three new species from Africa and illustrated two others which were not available to McKenzie. Yet another has been described from Kenya by De Lotto (1957). In the present paper, descriptions of two new species are given, one from Kenya and the other from Ceylon, and opportunity is taken to redescribe *L. buxtoni* (Laing), a species not discussed by McKenzie (1950) but tentatively assigned to the genus earlier by McKenzie (1939). The latter species, known only from Samoa, probably comes closest to the type species, also from Samoa.

A total of twenty-four species is now known in *Lindingaspis* and a key to twenty-three of these is given on p. 10.

The writer wishes to express his gratitude to Professor H. L. McKenzie, of the University of California, Davis, California, for kindly examining the three main species discussed and for giving his valued opinions.

GEOGRAPHICAL DISTRIBUTION

There has been no further evidence of an extension in distribution since McKenzie's discussion. All that can be stated is that the genus is not of new world origin. In the Palaearctic Region it is represented only in Japan by *L. setiger* (Maskell). Apart from *L. rossi* (Maskell), which is now almost a cosmopolitan species, eleven are known from the Ethiopian Region, five from the Oriental Region and two from Australasia. In the Pacific area only Samoa is known to possess its own species of which two seem to be most closely related to *L. setiger* from Japan. If it is assumed that the latter species represents an extension of the genus from the Oriental Region, there is possible evidence here, in common with many other groups of insects, that the Pacific species of *Lindingaspis* are an off-shoot of those from the Oriental Region.

It seems obvious that many more species remain to be discovered. The Ethiopian Region will yield a good proportion of these but it is interesting that none has been discovered in the Malagasian area despite extensive collecting recently. Not a single species has been discovered in Indonesia or New Guinea but this is due probably to a lack of collecting as there are no ecological factors to exclude the group from these areas. The accompanying map (Text-fig. 4) shows the distribution based on holotype data. The known distribution of each species is given in the key.

LINDINGASPIS MacGillivray

Lindingaspis buxtoni (Laing)

(Text-fig. 1)

Chrysomphalus buxtoni Laing, 1927 : 40, 41.
Lindingaspis buxtoni (Laing) McKenzie, 1939 : 53.

Described originally from SAMOA : Malololelei, on the bark of a shrub, July, 1924. Laing has described the scale as " deep brown to black, subcircular to elliptical, flattish around the marginal area gradually rising to a very low nipple-like deep black excentric larval exuvium ; surface somewhat irregular and deposited in concentric layers. Size 4·5 mm. by 3 mm. in elliptical specimens, 3 mm. diameter in subcircular ones ". It is possible that the latter smaller scales are of the males.

Adult female as mounted on the slide, rather large and attaining a length of 2·5 mm., slightly longer than wide, becoming sclerotized at maturity. Prosoma without lateral tubercles. Pygidium wide, with distinctive pattern of sclerotization as shown in the accompanying illustration. Perivulvar pores in four groups, each anterior lateral group with 9–14 pores, posterior lateral groups each with 8–11 pores, occasionally a single pore between the anterior groups. Vulva situated about one third length of pygidium from base. Anal opening smaller in diameter than a median lobe situated at centre of pygidium. Lobes well developed, there being three

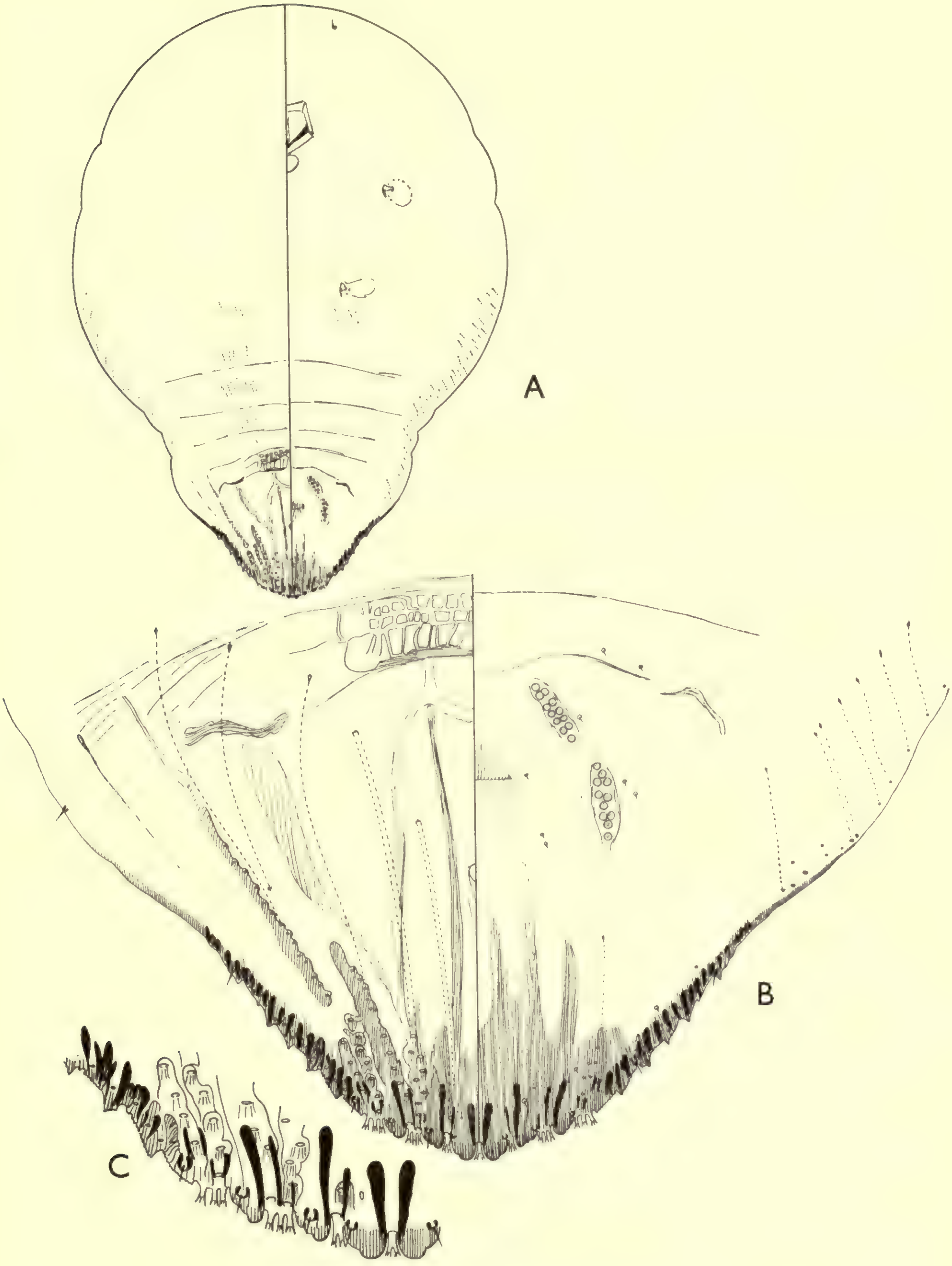

Fig. 1. *Lindingaspis buxtoni* (Laing)

pairs present, median pair longest, each with single notch on outer margin ; second and third lobes about same size but smaller than median pair, each with two notches on outer margin. Plates small but distinct, apices fimbriate, distributed as follows : a pair between median lobes, a pair in each first interlobular space, three in second interlobular space and three beyond each third lobe. Beyond this point to seta of fourth segment, the margin is heavily sclerotized and serrate. Paraphyses prominent and well developed, some of the largest being clavate, the distinguishing features as follows : paraphyses arising from inner angles of all lobes by far the largest and wide ; the paraphyses arising from outer angle of second lobe small and slender ; paraphyses beyond third lobes wide and tending to be fused. Dorsal ducts of two sizes but the large-sized macroducts departing from the normal distribution in being numerous in the third interlobular space and extending well into the pygidium ; without a series of ducts extending forward from seta of fourth segment ; dorsal and ventral marginal macroducts reaching to point opposite second spiracles.

This species departs from the general form of the genus in a few characters but the rather thick paraphyses between the lobes, the indeterminate and fused form of the paraphyses beyond the third lobes and the general sclerotic pattern of the pygidium ally this species to *L. setiger* (Maskell) known only from Japan.

Lindingaspis fusca McKenzie

Aspidiotus rossi Maskell ; Green, 1896e : 45 (Misidentification).
Aspidiotus rossi Maskell ; Green, 1937 : 831. (In part.)
Lindingaspis fusca McKenzie, 1943 : 151, 152.
Lindingaspis fusca McKenzie ; McKenzie, 1950 : 101.

Specimens are at hand from Ceylon on *Capparis moonii* which were seen by Green and on which he based the first reference given above. These refer to *L. fusca*. Brain & Kelly (1917) thought that they had Green's species in South Africa and that this was different from *A. rossi* Maskell ; they accordingly named this species *Chrysomphalus rossi* var. *greeni*. It was indeed different from *A. rossi* but was also distinct from the Ceylon species.

***Lindingaspis kenyae* sp. n.**

(Text-fig. 2)

Scale of adult female purple-brown, about 2·0 mm. in diameter. Exuviae almost black, sub-central.

Male scale more elongate but smaller, light purple-brown.

Adult female attaining a length of 1·25 mm., slightly longer than wide. Thoracic tubercles prominent, situated at a point midway between the first and second spiracles. Pygidium rather narrow, rounded apically. Perivulvar pores in four groups, anterior lateral groups each with 5–8 pores, posterior lateral groups each with 3–6 pores. Anal opening slightly longer than a median lobe situated at centre of pygidium. Vulva situated nearer base of pygidium. Three pairs of well developed lobes present, all notched once on outer margin. Median lobes largest, each with broad basal sclerosis extending forward and as long as the lobe itself. Second and third lobes progressively smaller. Plates only slightly longer than lobes, with apices fimbriate ; there being one broad plate between median lobes ; a pair between each median and second lobe ; three between second and third lobes, the inner plate being quite small. There is a single membranous plate anterior to third lobe followed by two sclerotized plate-like structures. Anterior to this, pygidial margin heavily sclerotized and serrated to seta marking position of fourth segment. Paraphyses short as in accompanying diagram and with the following important characteristics : paraphyses arising from inner angle of median lobes slender and shorter

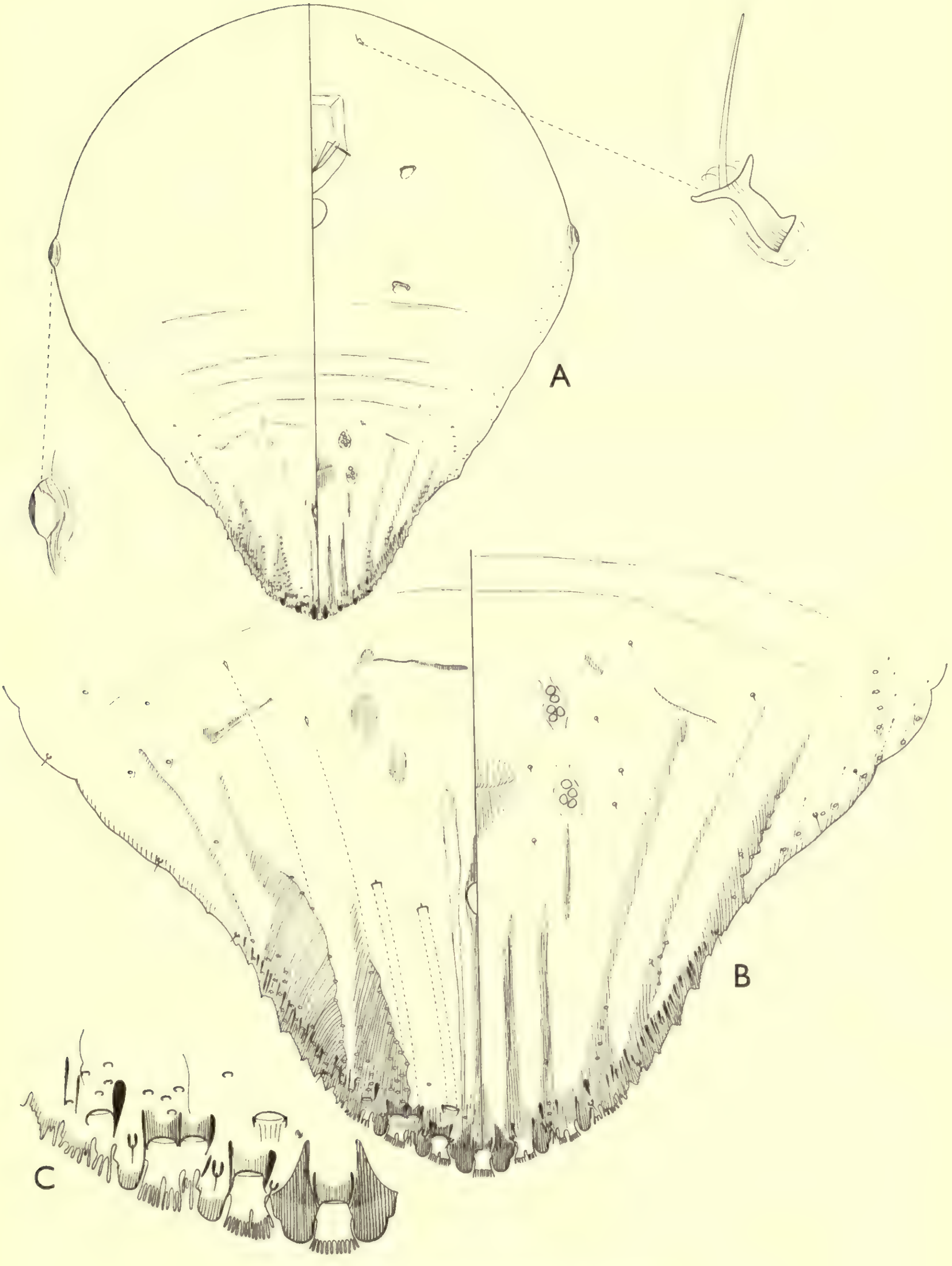

FIG. 2. *Lindingaspis kenyae* sp. n.

than basal scleroses ; those arising from outer angle of second lobes in two parts ; the middle paraphyses between second and third lobes short and slender, the spaces between the paraphyses of the second and third interlobular spaces sclerotized. Dorsal pygidial ducts of two sizes ; the large type between the interlobular spaces, there being two in the space between each median and second lobe ; the medium sized ducts extending along the margins and associated with the paraphyses, the row extending forward from near the seta which marks the position of the fifth segment reaching to a point midway between pygidial margin and lateral scar, a row also present from the seta marking position of fourth segment, these ducts extending to lateral scar but lying slightly inwards from the sclerotized area normally in this position ; two or three similar ducts also present anterior to lateral scar.

Holotype. ♀. KENYA: Nairobi, on leaves of *Rangaëris brachyceras* (Orchidaceae), 1961. In British Museum (Nat. Hist.).

Paratypes. 6 ♀. KENYA : same data as holotype. 1 ♀. KENYA : Nairobi, on the leaves of *Calanthe volkensii* (Orchidaceae). In British Museum (Nat. Hist.).

The material was submitted for identification by H. K. Airy Shaw, Royal Botanic Gardens, Kew.

This species comes very close to *L. fusca* but differs in the following characters. The middle paraphysis between the second and third lobes is short and not longer than the paraphysis arising from the outer angle of the second lobe ; in *L. fusca* the middle paraphysis is noticeably longer. The medium sized ducts extending forward from seta marking position of fifth segment reach only halfway to lateral scar ; the pygidium is narrower and lacks the definite pattern of sclerotization found in *L. fusca*.

***Lindingaspis mackenziei* sp. n.**

(Text-fig. 3)

Aspidiotus rossi Maskell ; Green 1937 : 331. (In part.)

Scale of adult female dark chocolate-brown with sub-central exuviae even darker. About 2·5 mm. in diameter.

Male scale similar to that of female but smaller and more elongate.

Adult female about 1·5 mm. long, a little longer than wide. Prosomatic region membranous with thoracic tubercles on level with posterior spiracles. Pygidium narrow with sides noticeably concave, apex rounded. Perivulvar pores in four groups, each anterior lateral group with 11–16 pores and posterior lateral groups each with 5–11 pores, there being noticeable sclerotized areas on the inner sides of the anterior groups. Perivulvar pores and vulva situated near base of pygidium. Anal opening slightly larger than a median lobe, situated near centre of pygidium. Three pairs of lobes present, all of similar size and shape ; each with a distinct notch on outer margin but third lobe often with two notches ; a minute notch also present at base on inner margins. Plates well developed and slightly longer than lobes, apices fimbriate ; a pair between median lobes, a pair between median and second lobes, three between second and third lobes and a single membranous plate lateral to third lobes followed by a pair of sclerotized plate-like processes ; margin forward from these plates to a point near seta of fourth segment sclerotized and serrated. Paraphyses well developed, the important characteristics being the paraphyses arising from inner and outer angles of second lobes being of equal length and middle paraphysis in the third interlobular space noticeably longer than the two lateral paraphyses in this space ; outer angle paraphysis of median lobe much longer than inner angle paraphysis of median lobe. Dorsal ducts of the two usual sizes, there being two large macroducts in the second interlobular space ; a row of medium sized ducts extending forward from seta on fourth segment and row extending forward from near seta of fifth segment reaching a point about

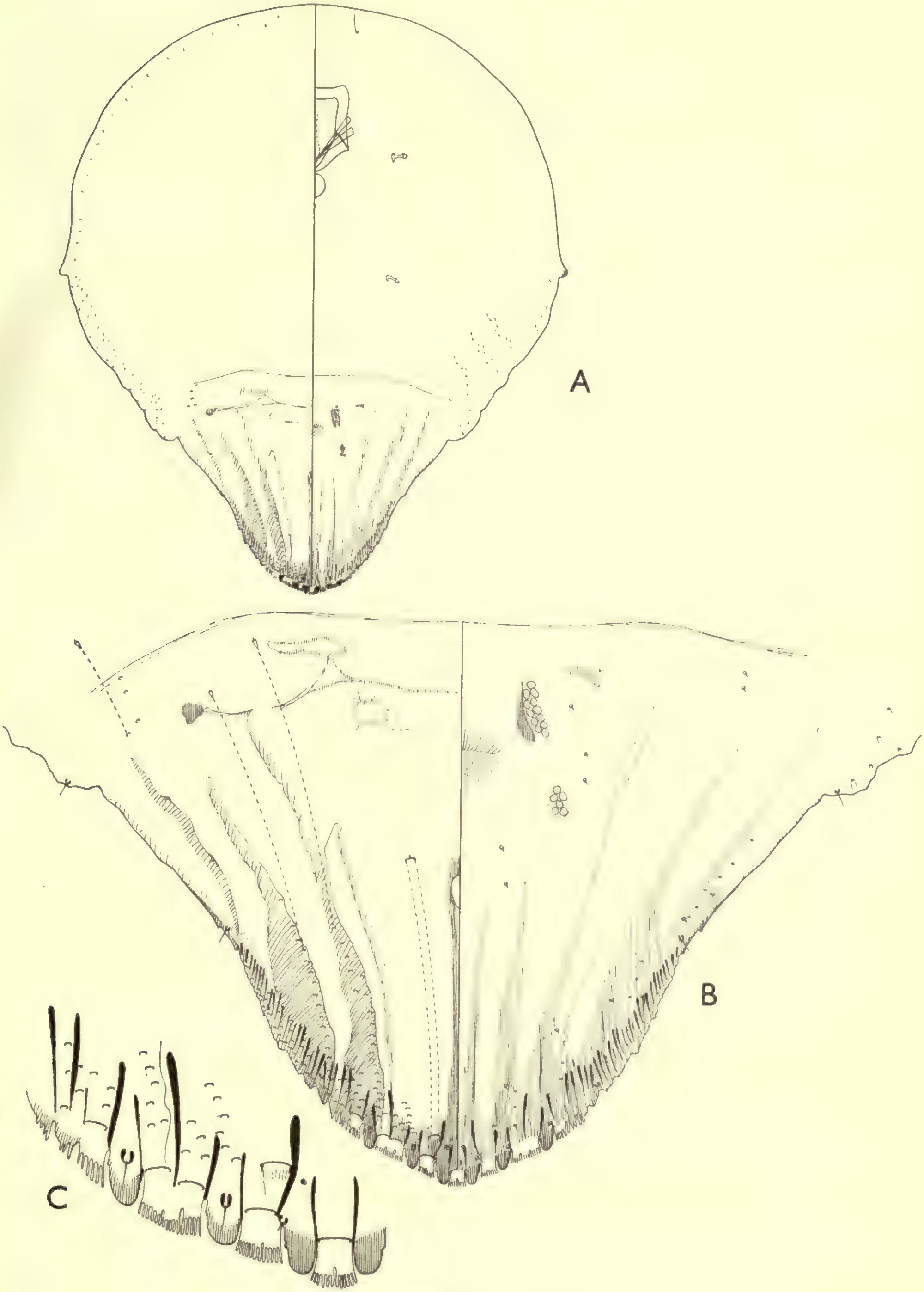

FIG. 3. *Lindingaspis mackenziei* sp. n.

halfway or less from margin to lateral scar ; a group of three or four also present anterior to lateral scar ; other ducts as shown in diagram. Dorsal microducts around margin of two distinct sizes, a larger type on margin as far forward as thoracic tubercle and a submarginal row of minute ducts on prepygidial segments and extending to apex of prosoma.

Holotype. ♀. CEYLON : Colombo, on leaves of *Cocos nucifera* (Palmae) without further information. In British Museum (Nat. Hist.).

Paratypes. CEYLON : 6 ♀. Same data as holotype. CEYLON : Peradeniya, 1 ♀ on *Garcinia spicata* (Guttiferae), ii.1900. 2 ♀, iii.1905. 4 ♀, viii.1907. 1 ♀, CEYLON : Pundaluoya, on *Nothopegia* sp. (Anacardiaceae), vi.1897. In British Museum (Nat. Hist.).

This species comes closest to *L. similis* McKenzie described from Samoa but differs in possessing two large macroducts in the second interlobular space instead of three or four, the plates are much less differentiated, the outer angle paraphysis is much longer than the inner angle paraphysis on the median lobes whereas in *L. similis* they are of similar length and the vulva is situated near base of pygidium instead of near centre as in *L. similis*. It differs from *L. tingi* mainly in the similar size of the lateral angle paraphysis of second lobes whereas in *L. tingi* the outer angle paraphysis is about one half the length of the mesal angle paraphysis.

The species is named after Professor Howard L. McKenzie who has given the author valuable assistance on various matters in connection with the present paper and on many other occasions.

Lindingaspis rossi (Maskell)

Aspidiotus rossi Maskell, 1891 : 3.
Aonidiella subrossi Laing, 1929 : 25, 26, **syn. n.**
Lindingaspis rossi (Maskell) Ferris, 1938a : 246.
Aonidiella subrossi Laing ; McKenzie, 1938 : 4.

Laing described *A. subrossi* from AUSTRALIA : New South Wales, on *Acacia rubra* and mentioned that it lacked perivulvar pores. It is evident from the type slide that the description was based on second stage females and these are identical with second stage females of *Lindingaspis rossi*.

KEY TO SPECIES OF *LINDINGASPIS*

1 Perivulvar pores present in four or five distinct groups 3
– Perivulvar pores absent 2
2 (1) Ventral surface of pygidium beneath vulva with semi-circular area of sclerotization, paraphyses associated with lobes as long as lobes or shorter (GUINEA) ***benaensis*** Balachowsky
– Ventral surface of pygidium beneath vulva without semi-circular area of sclerotization, paraphyses associated with lobes about twice as long as lobes (KENYA) . . . . ***crocea*** De Lotto
3 (1) Median lobes each with a well defined basal sclerosis, developed as much as the lobe itself, this in addition to mesal and lateral angle paraphyses of median lobes 4
– Median lobes without scleroses, with only mesal and lateral angle paraphyses 6
4 (3) Dorsal submarginal zone of fifth segment of pygidium with 4–7 large sized macroducts (UGANDA, ETHIOPIA, SOMALIA, GHANA, NIGERIA, PRINCIPE, SOUTH AFRICA) . . . . ***opimus*** (Silvestri)

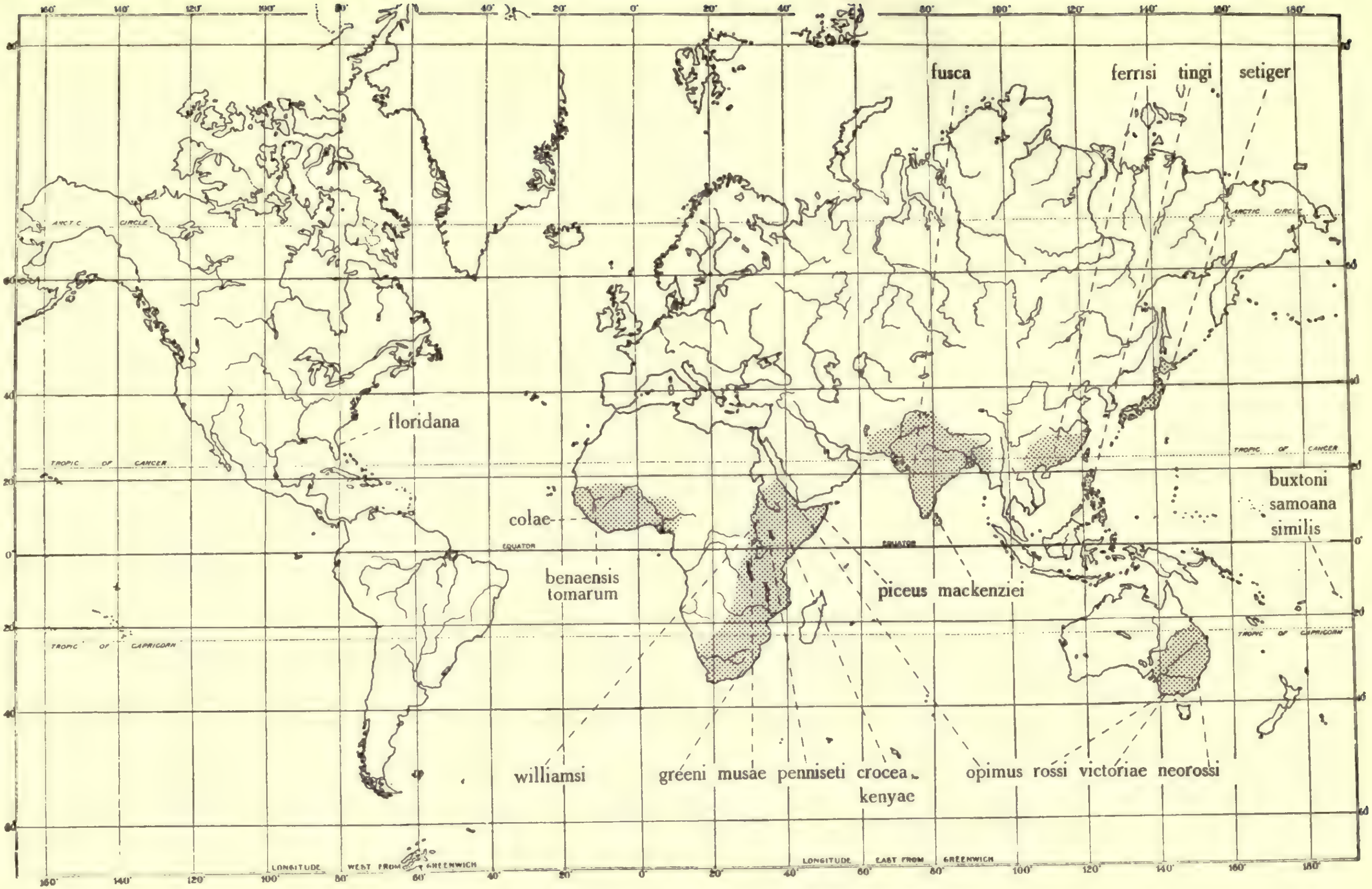
fusca
ferrisi
tingi
setiger
floridana
buxtoni
samoana
similis
colae
benaensis
tomarum
piceus
mackenziei
williamsi
greeni
musae
penniseti
crocea
kenyae
opimus
rossi
victoriae
neorossi
ARCTIC CIRCLE
TROPIC OF CANCER
EQUATOR
TROPIC OF CAPRICORN
LONGITUDE WEST FROM GREENWICH
LONGITUDE EAST FROM GREENWICH

FIG. 4. *Lindingaspis*, geographical distribution.

– Without dorsal submarginal macroducts on segment five of pygidium . . 5

5 (4) Middle paraphysis between second and third lobes noticeably longer than paraphysis arising from lateral angle of second lobes. With a row of medium-sized ducts in fifth segment from margin to lateral scar (India, Ceylon) ***fusca*** McKenzie

– Middle paraphysis between second and third lobes about same size as paraphysis arising from lateral angle of second lobes. With row of medium-sized ducts on fifth segment reaching from margin to about half distance to lateral scar (Kenya) . . . . ***kenyae*** sp. n.

6 (3) With fewer than three plates between second and third lobes . . . 7

– With three plates between second and third lobes 9

7 (6) With two plates between second and third lobes 8

– With plates between second and third lobes fused into a single large plate (Sierra Leone) . . . . ***colae*** (Laing)

8 (7) Without a median paraphysis in the space between second and third lobes. Median ventral zone above median lobe with a longitudinal fusiform thickening (Somalia, Uganda, Kenya) . . . . . . ***piceus*** (Malenotti)

– With a slender median paraphysis in the space between second and third lobes. Median ventral zone above median lobe without a fusiform thickening (Tanganyika, Sierra Leone, Guinea, Congo (Leopoldville)) ***musae*** (Laing)

9 (6) Median paraphysis between second and third lobes longer than paraphysis arising from lateral angle of second pygidial lobe 11

– Median paraphysis between second and third lobes same size or shorter than paraphysis arising from lateral angle of second pygidial lobe . . . 10

10 (9) Lobes each with a lateral notch (Sudan) . . . ***williamsi*** Balachowsky

– Lobes asymmetrical and entirely without notches (Uganda, Cameroons) ***penniseti*** Hall

11 (9) With a series of medium-sized dorsal pygidial macroducts extending forward from near seta of fourth abdominal segment 12

– Without this series of medium-sized dorsal macroducts. 16

12 (11) With 2–4 small dorsal ducts situated between margin and midline near base of pygidium 13

– Without small dorsal ducts situated between margin and midline near base of pygidium 14

13 (12) Paraphysis arising from outer angle of each second pygidial lobe longer than that on inner side of this lobe ; posterior lateral groups of perivulvar pores each with less than nine pores (India, China, Formosa) . ***ferrisi*** McKenzie

– Paraphysis arising from outer angle of each second lobe about same length as paraphysis on inner side of this lobe ; posterior lateral groups of perivulvar pores each with ten or more pores (Japan) . . . ***setiger*** (Maskell)

14 (12) Paraphysis arising from lateral angle of second pygidial lobe about one-half as long as paraphysis on inner side of this lobe (Philippine Islands) ***tingi*** McKenzie

– Paraphysis arising from lateral angle of second pygidial lobe about same length as paraphysis on inner side of this lobe 15

15 (14) With three or four large-sized dorsal pygidial macroducts extending forward between median and second lobes. Vulva situated near centre of pygidium (Samoa) . . . . ***similis*** McKenzie

– With two large-sized dorsal pygidial macroducts extending forward between median and second lobes. Vulva situated near base of pygidium (Ceylon) ***mackenziei*** sp. n.

16 (11) With ten or more medium-sized dorsal macroducts extending forward between lateral paraphysis of second lobe and middle paraphysis between second and

third lobes. Dorsal medium-sized macroducts on fifth segment distributed on the sclerotized zone and extending on to the membranous area (South Africa, Uganda) . . . . ***greeni*** (Brain & Kelly)

– With less than ten dorsal intermediate macroducts extending forward between lateral paraphysis of second lobe and middle paraphysis between second and third lobes. Dorsal intermediate macroducts on fifth segment confined to sclerotized area 17

17 (16) With a submarginal lateral series of dorsal medium-sized pygidial macroducts originating at or near lateral scar and extending downwards 19

– Without a submarginal lateral series of dorsal medium-sized pygidial macroducts originating at or near lateral scar and extending downwards 18

18 (17) With a single membranous plate anterior to each third lobe. Ducts in row arising from between second and third lobes becoming progressively larger anteriorly (U.S.A., India, Malaya) . . . . . ***floridana*** Ferris

– With three membranous plates anterior to each third lobe. Ducts in row arising from between second and third lobes of same size (Guinea, Sierra Leone) ***tomarum*** Balachowsky

19 (17) Paraphyses arising from lateral angle of second lobe minute and shorter than neighbouring paraphyses (Samoa) . . . . . . ***buxtoni*** (Laing)

– Paraphyses arising from lateral angle of second lobe long and slender, about same size as neighbouring paraphyses 20

20 (19) With only two or three large-sized dorsal pygidial macroducts in space between median and second lobes. Presence of similar large ducts at anterior end of row of ducts arising from between middle paraphysis between second and third lobes and mesal paraphysis of third lobes (Australia, New Zealand, U.S.A., Ceylon, China, Japan, Philippine Islands, South Africa, Southern Rhodesia, Tanganyika, Mauritius, Portugal, Madeira) ***rossi*** (Maskell)

– With four or more large-sized dorsal pygidial macroducts in space between median and second lobes. Row of ducts extending forward between middle paraphysis between second and third lobes and mesal paraphysis of third lobe of same size 21

21 (20) With 16 or more medium-sized ducts extending forward between inner angle paraphysis of third lobe and middle paraphysis between second and third lobes. With three recognizable plates beyond each third lobe (Australia) ***neorossi*** McKenzie

– With less than 16 medium-sized ducts extending forward between inner angle paraphysis of third lobe and middle paraphysis between second and third lobes. With a single recognizable plate beyond each third lobe (Australia) ***victoriae*** (Cockerell)

II. THE GENUS *ANDASPIS* MACGILLIVRAY WITH DESCRIPTIONS OF TWO NEW ALLIED GENERA (DIASPIDINI)

In a revision of the genus *Andaspis*, Rao & Ferris (1952) assigned to it a total of ten species. Since then further species have been added which, together with others transferred from *Lepidosaphes* in the present paper, and two new species, give a total of twenty-two species now in the genus.

It is not the intention here to enlarge on the definition of the genus given by Rao & Ferris. As these authors have pointed out, the type species of the genera *Andaspis* and *Lepidosaphes* are quite different but the difficulty is to determine a point at which these genera can best be separated. The most important character clearly separating the two genera is the shape of median lobes. In a key to genera, Hall (1946) has given an excellent definition of the median lobes in *Andaspis* as being " close together, with inner margins straight, diverging slightly apically before curving round to a long oblique outer margin ". This outer margin has numerous notches and the normal lateral margin is either short or non-existent. In *Lepidosaphes* and its nearest relatives the median lobes have one or two notches on the outer margins but the sides always show some signs of being parallel. There are possibly intermediate forms at present placed in the genus *Lepidosaphes* but until this genus is revised the following species are best retained in *Andaspis*.

The type species is almost cosmopolitan but its most important and interesting distribution is in the Oriental Region. Another species, described from U.S.A., is known from Hawaii but is recorded by Zimmerman (1948) as being intercepted from the Philippine Islands and Singapore at Hawaii. It is expected that this species will be found eventually in the Oriental Region. Of the remaining species three are known from Japan and these may be regarded as an extension of the twelve species known from the Oriental Region. Two have been described from the Australasian Region and three from the Ethiopian Region which include one from Mauritius as a representative of the Malagasian area. As is common with many groups within the Coccoidea none has yet been described from Indonesia, the Philippine Islands or New Guinea, although doubtless in due course some interesting forms will be discovered in these areas. It seems possible, however, that the genus has had its origin in the Oriental Region and the numbers now known from there represent a small fraction of those still to be discovered.

Included in the present revision are descriptions of two new genera which come close to *Andaspis*. One of these is represented by a single species from West Pakistan. The other genus contains two species, one from Northern Australia and the other from Java. Both of these genera come within the known range of distribution of *Andaspis*.

ANDASPIS MacGillivray

***Andaspis dasi* sp. n.**

(Text-fig. 5)

Female scale greyish, almost transparent, rather wide posteriorly, about 1·5 mm. long, exuviae yellow brown.

Male scale not seen.

Adult female fusiform about 1·2 mm. long, membranous except for pygidium, lateral margins of mesothorax, metathorax and first four abdominal segments quite strongly lobed. Lateral sclerotized spurs present on first to third abdominal segments. Anterior spiracles each with a group of 6–10 pores. First six abdominal segments each with blunt spur or boss on dorsum near margin and a pair set close together on each side of prothorax.

Pygidium rather pointed, with median lobes prominent, triangular, each with long blunt paraphysis at base. Second lobes much smaller but bilobed condition easily discernible, smooth. Gland spines in pairs on pygidium, very slender, those between median lobes small. Marginal macroducts numbering 6 pairs. Dorsal ducts small and slender, a large submedian

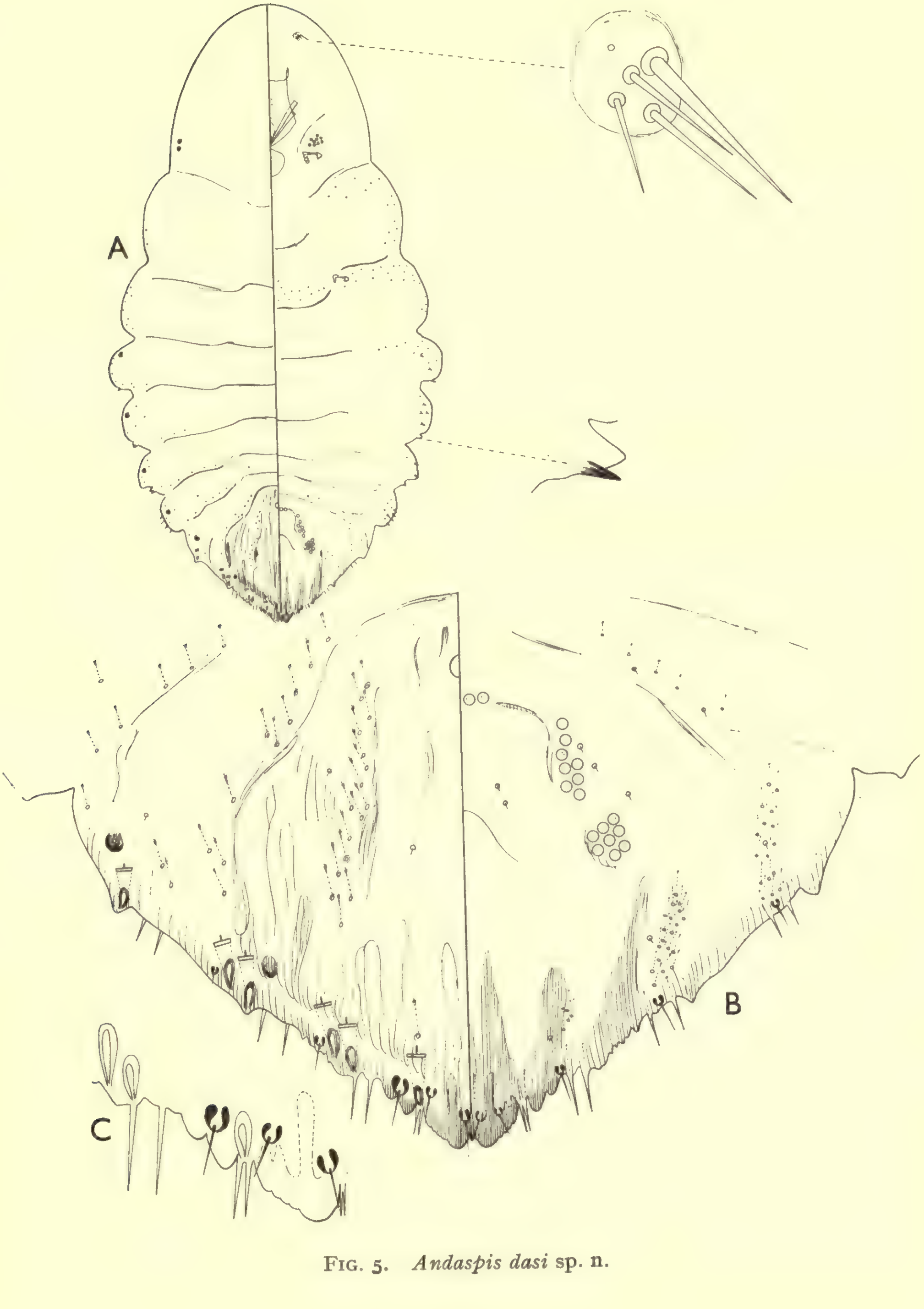

FIG. 5. *Andaspis dasi* sp. n.

group present on sixth segment and anterior to this on third to sixth segments the ducts form almost continuous rows whilst beyond these to mesothorax they are present around the submargins.

Ventral surface with perivulvar pores in five groups, median group with 4–10 pores, each anterior lateral group with 10–15 pores and each posterior lateral group with 8–14 pores. Microducts in distinct groups on pygidium ; present also around the margins and in the median area of mesothorax. Small gland spines sparse, on margins as far forward as first abdominal segment ; absent on metathorax.

Holotype. ♀. INDIA : West Bengal, Dooars, on *Camellia sinensis* (Camelliaceae), 1958 (*G. M. Das*), in British Museum (Nat. Hist.).

Paratypes. INDIA : same data as holotype. 1 ♀ in British Museum (Nat. Hist.), 1 ♀ in Zoological Survey of India (*Indian Museum*), Calcutta and 1 ♀ in Tocklai Experimental Station, Cinnamara, Assam.

This species comes close to *A. leucophloeae* Rao but differs in possessing second lobes and in having the median lobes set much closer together. It is also near *A. naracola* Takagi from which it differs in possessing a much larger group of ducts on the sixth segment.

Andaspis hibisci (Grandpré & Charmoy) **(comb. n.)**

(Text-fig. 6)

Mytilaspis hibisci Grandpré & Charmoy, 1899 : 32.
Lepidosaphes hibisci (Grandpré & Charmoy) Fernald, 1903b : 310.
Lepidosaphes hibisci (Grandpré & Charmoy) ; Mamet, 1941 : 32.

Scale of adult female narrow, elongate, about 1·5 mm. long ; dark reddish brown to almost black ; exuviae pale reddish brown.

Male scale about half length of female scale, light reddish brown.

A small elongate species measuring approximately 1·0 mm. long, pygidium always sclerotized, remainder of body either membranous or somewhat sclerotized. Anterior spiracles each with usually two pores. With small sclerotized spurs on the second, third and fourth segments. A small rounded submarginal spur or boss present dorsally on the first, second and fourth segments.

Pygidium with median lobes prominent, triangular and of the type common to the genus ; apical margin straight and dentate ; ventral surface of lobe with mid-basal seta each with the socket forming a small sclerosis on inner side ; setae at basal angles normal. Second lobes well developed, bilobed, the inner lobules with two or three notches. Gland spines in pairs ; those between median lobes and between median and second lobes short and no longer than the lobes. Anterior gland spines much longer. Marginal macroducts numbering six pairs. Dorsal ducts small, a submedian group on the sixth segment and submarginal and submedian groups distinct or almost merging on the three preceding segments.

Ventral surface with three groups of perivulvar pores ; median group with 2–4 pores, anterior laterals each with 5 or 6 pores, posterior laterals each with 2–4 pores. Microducts on the pygidium in small groups, sparse. Small gland spines on abdomen only, more numerous on the first abdominal segment, absent on the metathorax.

Although this species is extremely close to *A. punicae* (Laing) there are a few small differences. In *A. punicae* there are small scleroses at the basal angles of the median lobes formed from the sockets of small setae whereas in *A. hibisci* these sockets are normal. On the other hand a ventral mid-basal seta on the median lobe of *A. punicae* is normal whereas in *A. hibisci* the socket forms a noticeable sclerosis. The

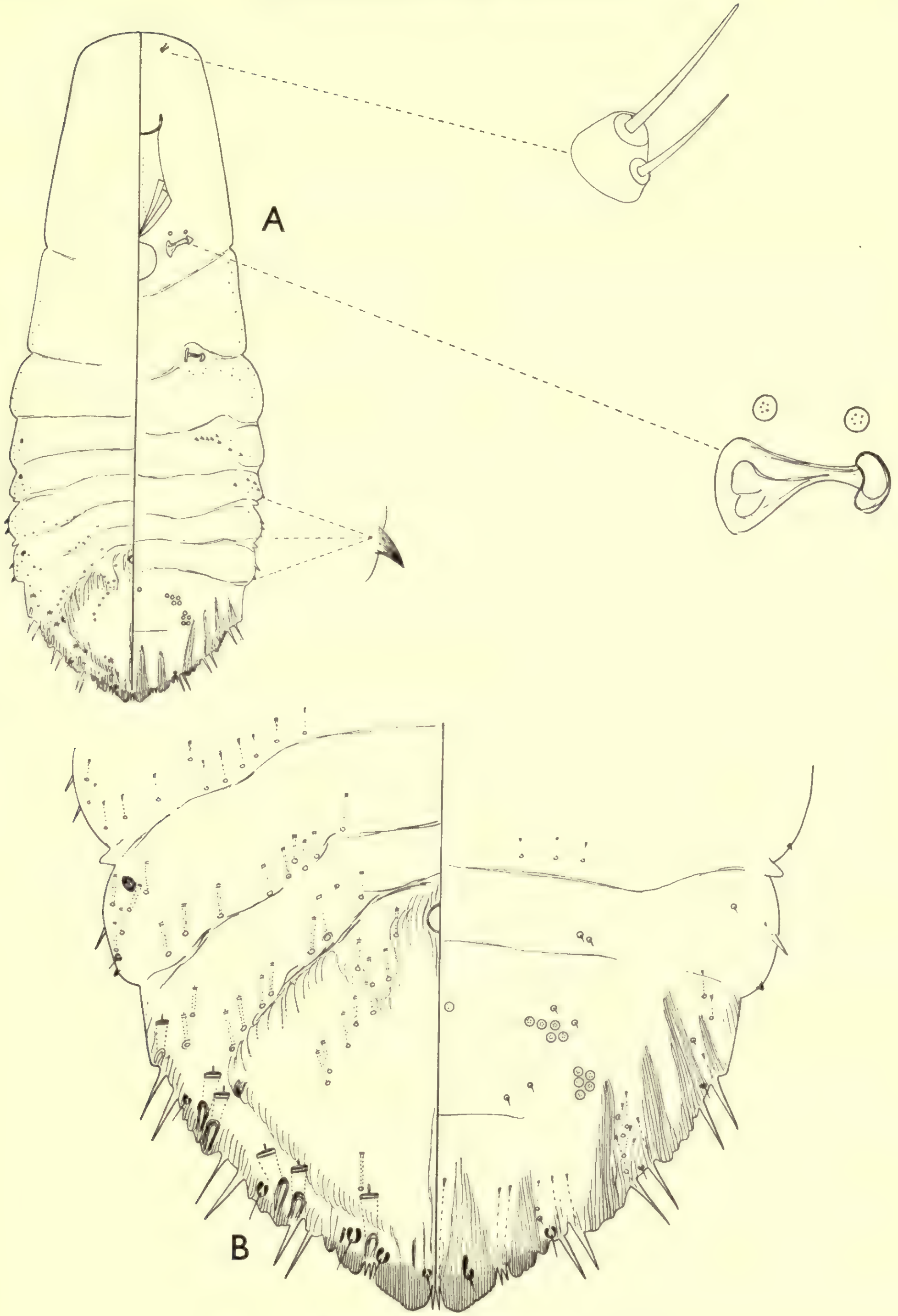

FIG. 6. *Andaspis hibisci* (Grandpré & Charmoy)

lateral sclerotized spurs of *A. hibisci* are, apparently, absent in *A. punicae*.

Specimens have been examined from MAURITIUS on *Hibiscus* sp. (Malvaceae) sent originally by D. D'Emmerez de Charmoy and on *H. rosa-sinensis* collected by R. Mamet 26.ii.1934.

***Andaspis kazimiae* sp. n.**

(Text-fig. 7)

Scale of adult female known from alcohol material only, pale reddish brown, of the form typical of the genus, about 1·5 mm. long.

Male scale of similar colour but smaller.

Adult female elongate oval attaining a length of 0·8 mm., membranous except for pygidium. Without marginal sclerotized spurs. Antennae with two long setae. Anterior spiracles with usually a single pore.

Pygidium with anal ring at base. Median lobes large and prominent, triangular but with apices somewhat rounded ; the dorsal surface with a transverse sclerotized bar almost connecting the basal angles ; the ventral surface with two well developed paraphyses arising from basal angles. Second lobes well developed, represented by a single lobule only, each longer than wide and notched on each margin ; these lobes with a characteristic curved appearance which is emphasized by the curved paraphyses arising from the lateral angles. Gland spines in pairs between the median lobes, between the median and second lobes and lateral to the second lobes. Beyond these on the fourth and fifth segments they are single. Marginal macroducts numbering four pairs. Dorsal ducts sparse, there being a few submarginal groups as far as metathorax and submedian groups on the third to sixth segments, those on segments five and six being usually in pairs.

Ventral surface with perivulvar pores in three groups ; median group with 3 or 4 pores, anterior lateral groups each with 6–8 pores and posterior lateral groups each with 4 or 5 pores. Small gland spines present on metathorax and first abdominal segment.

Holotype. ♀. WEST PAKISTAN : Behrain, on *Quercus* sp. (Fagaceae), 20.x.1961 (*S. K. Kazimi*), in British Museum (Nat. Hist.).

Paratypes. WEST PAKISTAN : 3 ♀. Same data as holotype. WEST PAKISTAN : Mana, on *Quercus* sp., 7 ♀, 28.ii.1962 (*S. K. Kazimi*) in British Museum (Nat. Hist.).

This species possesses only four pairs of pygidial macroducts, a character shared with *A. laingi* Rao and *A. retrusa* (Green). It differs from these species in the well developed second lobes and in the paucity of dorsal ducts.

Andaspis mackieana (McKenzie) **(comb. n.)**

Lepidosaphes mackieana McKenzie, 1943 : 153–155.
Lepidosaphes mackieana McKenzie ; Zimmerman, 1948 : 422.
Lepidosaphes mackieana McKenzie ; McKenzie, 1956 : 123.

As the median lobes are of the shape common to those in *Andaspis* the species is here transferred from *Lepidosaphes*, a move with which Professor H. L. McKenzie is in full accord. Although only known from U.S.A. and Hawaii, according to Zimmerman (1948) it has also been intercepted at Hawaii on material from the Philippine Islands and Singapore.

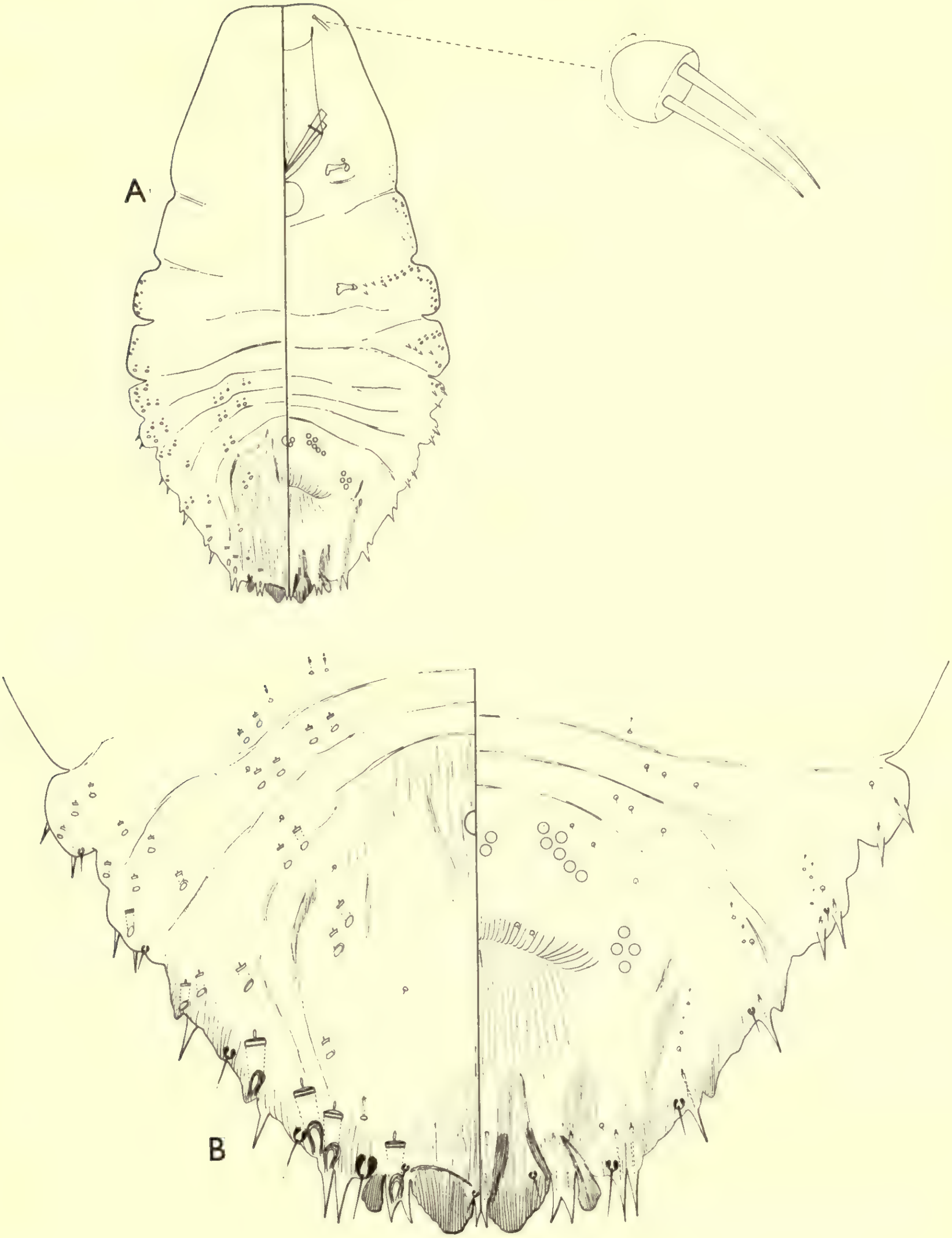

FIG. 7. *Andaspis kazimiae* sp. n.

Andaspis meliae (Green) **(comb. n.)**

(Text-fig. 8)

Lepidosaphes meliae Green, 1919c : 445, 446.
Mytilaspis (*Lepidosaphes*) *meliae* Green ; Ramakrishna Ayyar, 1919a : 24.

Scale of adult female dull dark brown, moderately convex, attaining a length of 2·5 mm., exuviae reddish brown, often with whitish secretion.

Scale of male smaller, about 1·2 mm. long, dark brown to almost black.

Adult female broadly oval, about 1·2 mm. long ; membranous except for pygidium. Marginal sclerotized spurs absent. Antennae with four setae of various sizes. Anterior spiracles each with a group of 3–5 pores.

Pygidium with prominent median lobes of the form common to the genus except that apices tend to be more rounded. Second lobes bilobed, the inner lobules barely perceptible. Gland spines in pairs on pygidium. Marginal macroducts numbering six pairs. Dorsal ducts minute, there being a submedian group on the sixth segment and a smaller group on seventh segment. Anteriorly on the abdomen there are submarginal and submedian groups.

Ventral surface with perivulvar pores in five groups, median group with 5–12 pores, anterior laterals each with 17–21 pores and posterior laterals each with 10–15 pores. A few submarginal microducts on pygidium. Gland spines present on abdomen only, pointed except on first abdominal segment where they are replaced by small sclerotized gland tubercles.

Described originally from INDIA : Coimbatore, on the " Nim " tree, *Melia azederach* (Meliaceae), 5.iii.1918 (*T. V. Ramakrishna Ayyar*).

In their revision of the genus *Andaspis*, Rao & Ferris (1952) considered this species for inclusion but excluded it without any definite reason. It comes very close to *A. mori* Ferris in the general distribution of ducts and in the shape of the median lobes but differs in possessing much larger second lobes and lacking the sclerotized spurs on the margins of the abdomen.

Andaspis mori Ferris

Andaspis mori Ferris ; Rao & Ferris, 1952 : 21.
Andaspis mori Ferris ; Ferris, 1953 : 59.

Specimens are at hand from FORMOSA : Kagi, on *Sapindus* sp. (Sapindaceae), 1.xi.1927 (*R. Takahashi*), which differ slightly from the description given by Ferris. They possess only two gland spines lateral to each second lobe instead of three and more numerous submedian ducts on the seventh segment. In other respects the specimens are identical. Professor H. L. McKenzie of the University of California, Davis, California, has very kindly compared these specimens with the holotype and given some useful information for which the writer is most indebted to him. So far as is known Dr. R. Takahashi has not mentioned this record in any of his publications.

Andaspis retrusa (Green) **(comb. n.)**

(Text-fig. 9)

Lepidosaphes retrusus Green, 1919c : 446.
Mytilaspis retrusus (Green) Ramakrishna Ayyar, 1919a : 24.

Scale of adult female dull to reddish brown, moderately convex, up to 1·5 mm. long, exuviae tending to be yellow brown.

Male scale lighter and paler in colour, length about 1·0 mm.

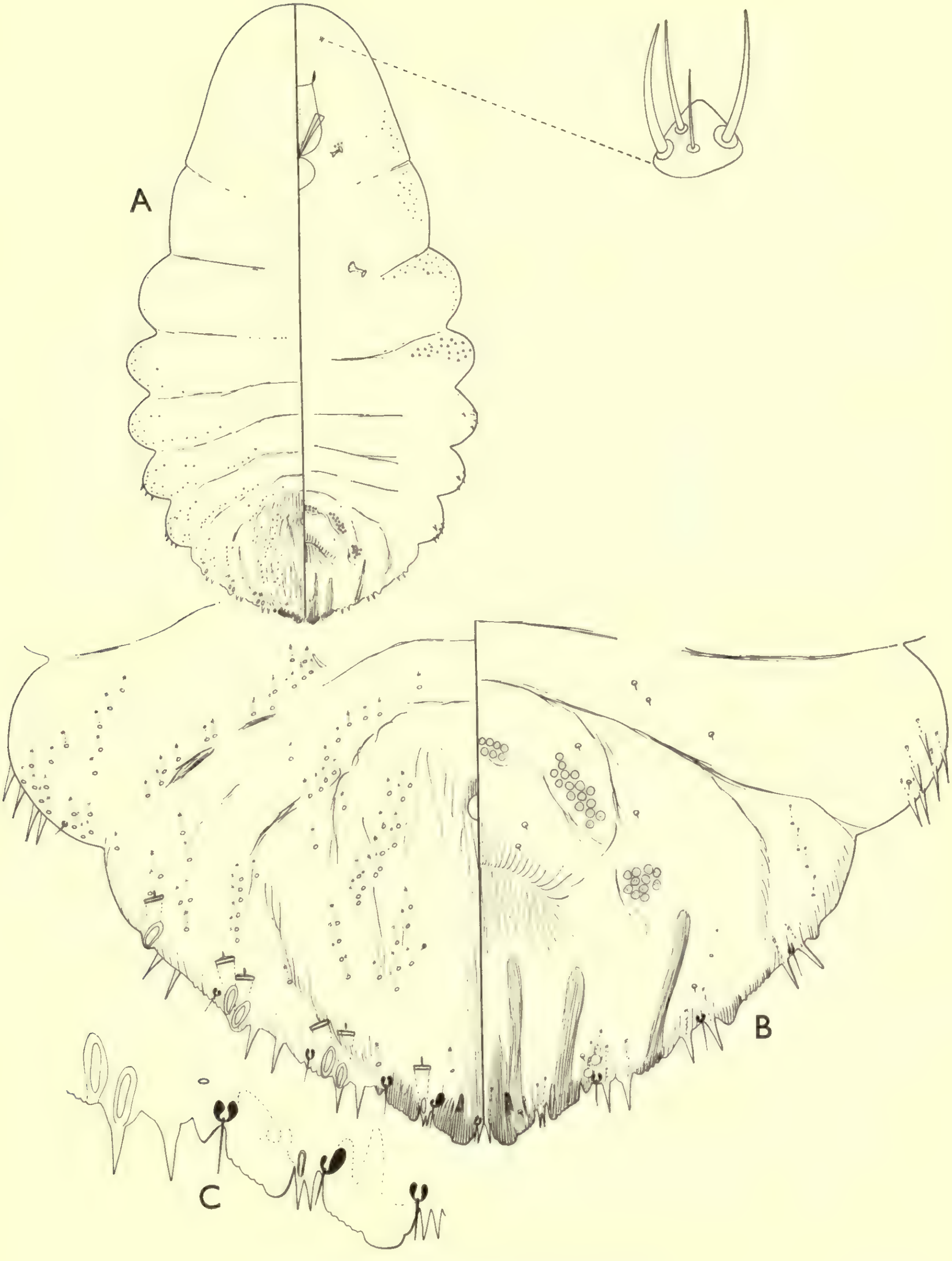

FIG. 8. *Andaspis meliae* (Green)

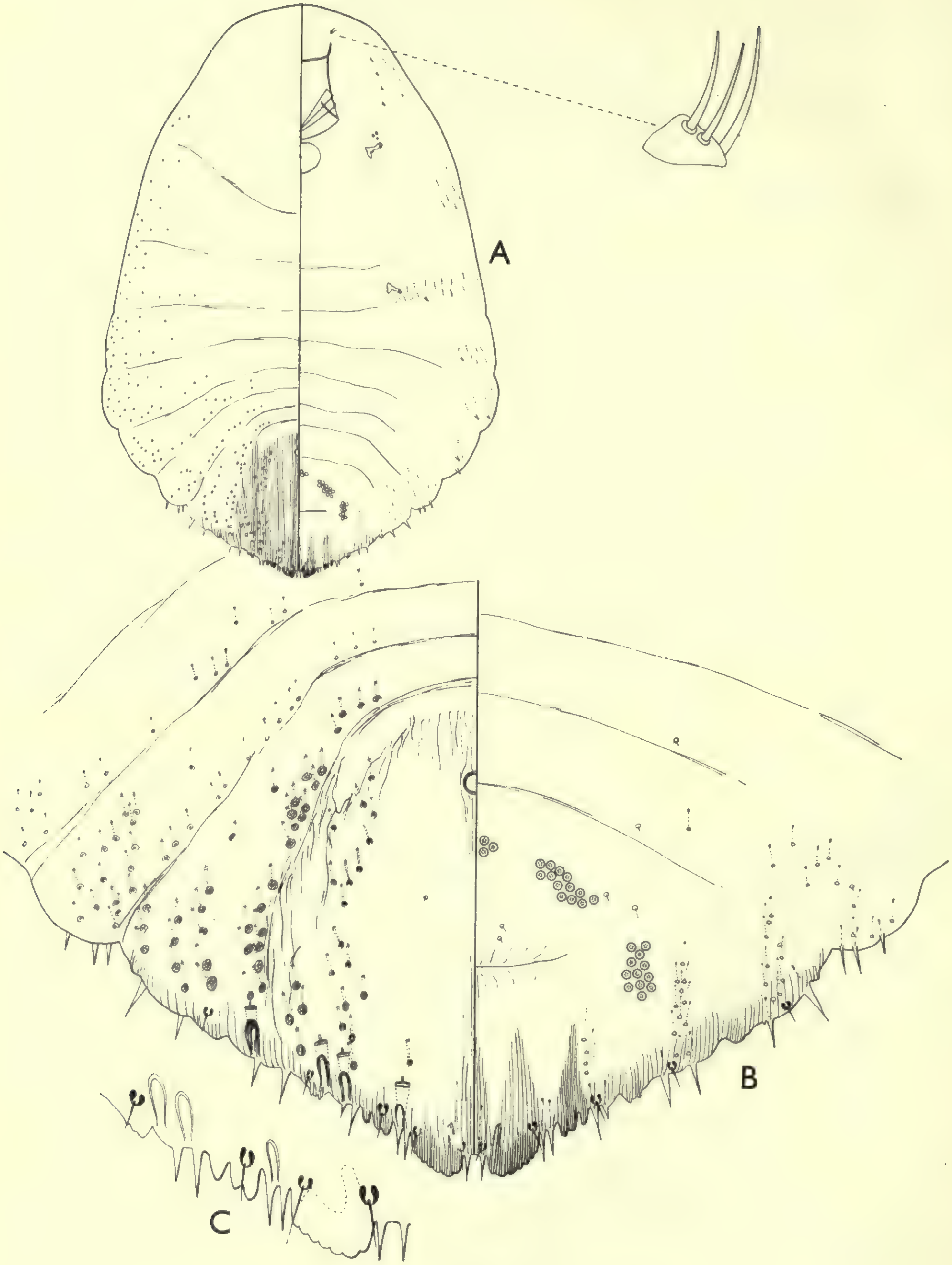

Fig. 9. *Andaspis retrusa* (Green)

A broadly oval species measuring approximately 0·8 mm. long, membranous except for pygidium but in some specimens body tending to become sclerotized. Without lateral spurs on abdomen. Anterior spiracles with 1–3 pores.

Pygidium broadly rounded. Median lobes prominent and wide, separated by a space slightly less than half the width of one lobe, each lobe with small blunt paraphyses arising from inner basal angle. In some specimens the lobes have parallel sides but in most specimens they are the usual triangular shape. Second lobes present, much smaller than median lobes, bilobed, the inner lobule usually with a single notch. Gland spines slender, in pairs on the pygidial segments, those between median lobes about the same length as the lobes. Marginal macroducts numbering four pairs. Dorsal ducts very small, numerous, the derm surrounding the orifices of posterior ducts often sclerotized. On the sixth and anterior abdominal segments the submarginal and submedian ducts merge into continuous rows ; present also around the submargins on the thorax.

Ventral surface with perivulvar pores in five groups, the median group with 6–12 pores, anterior laterals each with 8–18 pores and posterior laterals each with 11–18 pores. Microducts in distinct groups on pygidium and in submarginal groups on the prepygidial abdominal segments and thorax. Small gland spines sparse, there being at most only one or two on the abdominal margins and metathorax but sometimes absent entirely on one or more segments.

Green described this species from INDIA : Nilgiris, Dodabetta, on the mid-rib and principal veins on the underside of leaves of *Litsea whiteana* (Lauraceae). In possessing only four pairs of pygidial macroducts it comes close to *A. laingi* Rao but differs in possessing more numerous dorsal ducts and in lacking the marginal sclerotized spurs. Only three pairs of marginal macroducts were mentioned in the original description but there are clearly four pairs in all of the material studied.

Andaspis vandae (Rutherford) **(comb. n.)**

(Text-fig. 10)

Lepidosaphes vandae Rutherford, 1915 : 116.
Lepidosaphes vandae Rutherford ; Green, 1937 : 328.

Scale of adult female very dark brown to nearly black, shiny, about 2·75 mm. long, exuviae dull brown.

Male scale slightly paler than female scale and smaller.

Adult female elongate-oval, about 1·5 mm. long, membranous except for pygidium and head margins ; pygidium rounded. Anterior margin of head with a number of small conical processes resembling minute gland spines but structure difficult to determine. Lateral sclerotized spurs on the second, third and fourth abdominal segments. Anterior spiracles each with a group of 9–14 pores.

Pygidium with median lobes prominent, triangular and of the form typical of the genus. Second lobes smaller than the median pair. Third and fourth lobes represented by large sclerotized projections. Marginal macroducts numbering six pairs. Dorsal ducts minute. A small group present on seventh segment and a larger submedian group on sixth segment. On the prepygidial abdominal segments the submarginal and submedian ducts merge into almost continuous rows.

Ventral surface with perivulvar pores in five groups. Median group with 5–9 pores, each anterior lateral group with 12–15 pores and each posterior lateral group with 9–15 pores. Microducts on pygidium in groups, each with orifice opening on to a clear area of the derm. Small gland spines present on the abdominal segments, not numerous ; absent on the metathorax.

This species was described from CEYLON : Peradeniya, on *Vanda spathulata* (Orchidaceae), ix.1914. The accompanying illustration is based on specimens

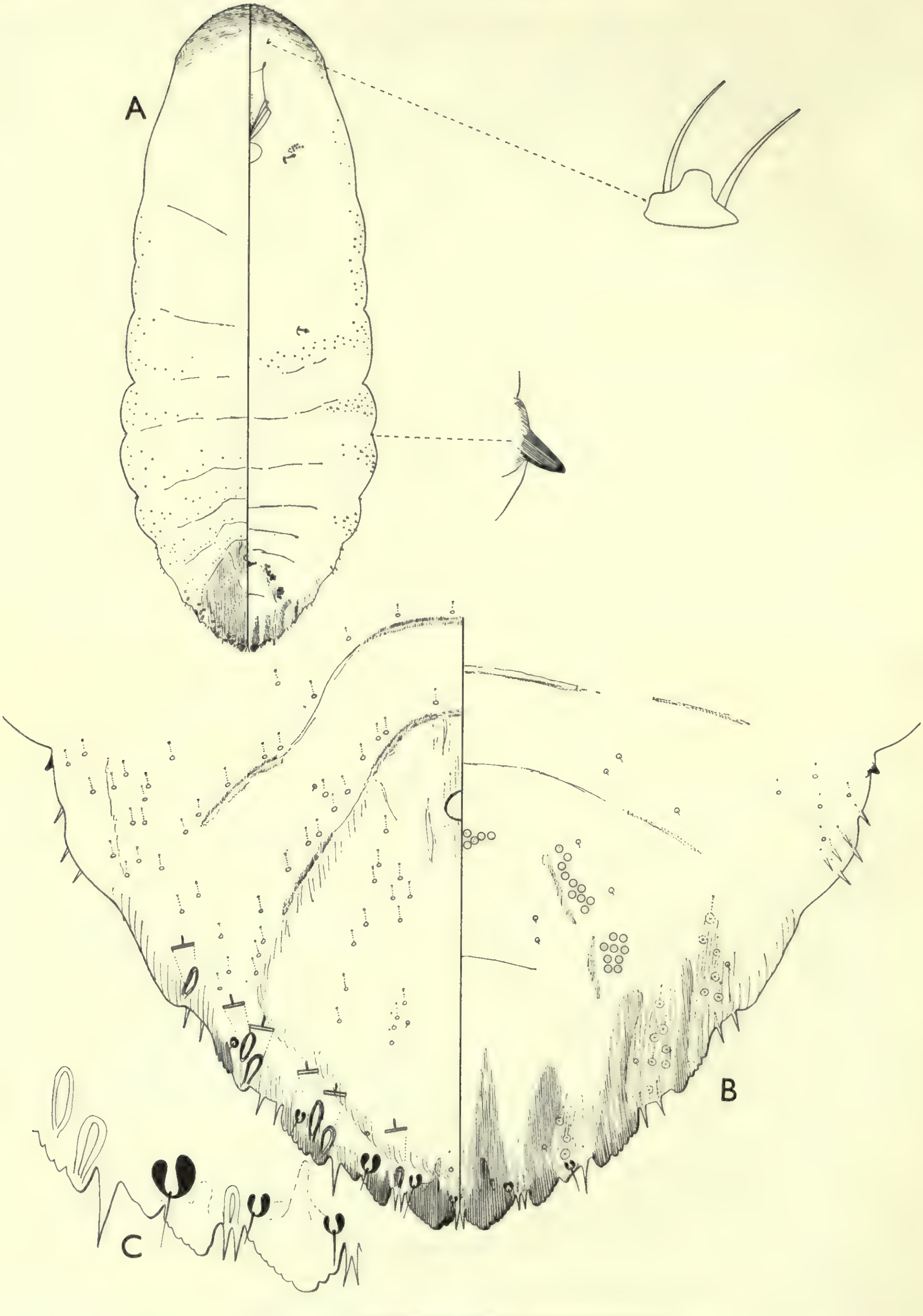

FIG. 10. *Andaspis vandae* (Rutherford)

collected at Ceylon, Colombo, on *Vanda teres*, ix.1911, originally in E. E. Green's collection, which agree with the description given by Rutherford. The species forms a distinct group with *A. mori* Ferris, *A. meliae* (Green) and *A. naracola* Takagi in possessing well developed second lobes and minute ducts.

Key to Species of *ANDASPIS*

1 Marginal macroducts numbering 4 pairs 2
– Marginal macroducts numbering 5 or 6 pairs 4
2 (1) Submedian group of dorsal ducts on sixth segment absent (India) ***laingi*** Rao
– Submedian group of dorsal ducts on sixth segment present 3
3 (2) Submedian group of dorsal ducts on sixth segment numbering only 2 and separated from submarginal group (Pakistan) . . . . ***kazimiae*** sp. n.
– Submedian group of dorsal ducts on sixth segment numerous and almost continuous with submarginal ducts (India) . . . ***retrusa*** (Green)
4 (1) With a stout club-shaped or blunt paraphysis extending into the pygidium either from the median basal angle or the middle basal part of each median lobe 5
– Without such a paraphysis extending into the pygidium, a paraphysis if present, being either transverse or present on ventral surface as two normal slender paraphyses only 13
5 (4) Submedian group of dorsal ducts on sixth segment absent (Almost Cosmopolitan) . . . . ***hawaiiensis*** (Maskell)
– Submedian group of dorsal ducts on sixth segment present 6
6 (5) With only one or two ducts flanking anal opening (Southern Rhodesia) ***halli*** Rao
– Ducts flanking anal opening numerous 7
7 (6) Ducts flanking anal opening in a definite row on sixth segment only . . 8
– Ducts flanking anal opening scattered on sixth and seventh segments . . 10
8 (7) Second lobes absent (India) . . . . ***leucophloeae*** Rao
– Second lobes present although small 9
9 (8) Lateral sclerotized spurs and dorsal submarginal tubercles or bosses present (India) . . . . ***dasi*** sp. n.
– Lateral sclerotized spurs and dorsal submarginal tubercles or bosses absent (Australia) . . . . ***numerata*** Brimblecombe
10 (7) Lateral sclerotized spurs absent, second lobes as wide as median lobes (India) ***meliae*** (Green)
– Lateral sclerotized spurs present, second lobes narrower than median lobes . 11
11 (10) Paraphysis extending into pygidium short and arising from basal angle of median lobe (China, Formosa) . . . . ***mori*** Ferris
– Paraphysis extending into pygidium about as long as lobe and arising from middle basal part of median lobe 12
12 (11) Dorsal ducts on prepygidial segments in almost continuous rows (Ceylon) ***vandae*** (Rutherford)
– Dorsal ducts on prepygidial segments in distinct submarginal and submedian groups (Japan) . . . . ***naracola*** Takagi
13 (4) Median lobes each with, at least, a small transverse paraphysis arising from one or both basal angles or, if the paraphysis extends from the inner basal angle into the pygidium, then it is never clavate or blunt 15
– Without definite slender paraphyses arising from basal angles of lobes . . 14
14 (13) Median lobes each with a small sclerosis at each basal angle formed by the socket surrounding a small seta, lateral sclerotized spurs absent (Tanganyika) ***punicae*** (Laing)

– Setal bases at basal angles of medial lobes normal, mid ventral basal part of median lobe with small sclerosis formed by the socket surrounding seta, lateral sclerotized spurs present (MAURITIUS) . ***hibisci*** (Grandpré & Charmoy)

15 (13) Second pygidial lobes distinctly developed 16

– Second pygidial lobes absent 20

16 (15) Dorsum of pygidium with a row of pores on sixth segment flanking anal opening, marginal macroducts numbering six pairs 17

– Dorsum of pygidium without such pores, marginal macroducts numbering five pairs (JAPAN) . . . . ***crawii*** (Cockerell)

17 (16) With transverse slender paraphyses arising from basal angles of median lobes and in addition a transverse bar slightly anterior to these 18

– Slender paraphyses not transverse, these extending into pygidium . . 19

18 (17) Second lobes not bilobed, with lateral blunt tubercles each bearing a duct on abdomen (JAPAN) . . . . ***kashicola*** (Takahashi)

– Second lobes bilobed, without lateral blunt tubercles each bearing a duct on abdomen (CEYLON) . . . . ***antidesmae*** Rao

19 (17) Paraphyses arising from inner basal angle of median lobes curving towards each other and away from the paraphyses arising from the outer basal angle (CHINA) . . . . ***yunnanensis*** Ferris

– Paraphyses arising from inner basal angle of median lobes curving away from each other and towards the paraphyses arising from the outer basal angle (U.S.A., HAWAII) . . . . ***mackieana*** (McKenzie)

20 (15) With a group of submedian ducts flanking anal opening on sixth abdominal segment 21

– With but a single duct or none near anal opening on sixth abdominal segment (AUSTRALIA) . . . . ***incisor*** (Green)

21 (20) Dorsal ducts very slender, paraphysis arising from lateral angle of median lobes robust, lateral sclerotized spurs absent (CHINA) ***micropori*** Borchsenius

– Dorsal ducts not slender, without paraphysis arising from lateral angle of median lobes but slender transverse paraphysis arising from inner basal angle, lateral sclerotized spurs present (CEYLON) . ***erythrinae*** (Rutherford)

CAIA **gen. n.**

Type species : *Caia quernea* sp. n.

Scales of adult female and male not seen.

Adult female of the tribe Diaspidini and belonging to the *Lepidosaphes* series, i.e. with two-barred ducts and gland spines on the pygidial margin, there being a pair between the median lobes. Median lobes prominent with one or at most two notches on lateral margins and with a well developed clavate paraphysis arising from the inner angle of each median lobe. Second and third lobes represented by, at most, small sclerotized points. Marginal macroducts present. Anal opening situated towards apex of pygidium.

This genus has close affinities with *Andaspis* but differs mainly in the shape of the median lobes which have only one or two notches on the lateral margins and in the position of the anal opening which is situated towards the apex rather than at the base of the pygidium.

Caia quernea **sp. n.**

(Text-fig. 11)

Scales not seen.

Adult female elongate oval, fusiform, about 1·0 mm. long, membranous except for pygidium. Lateral sclerotized spurs absent. Anterior spiracles with two or three pores. Anal ring

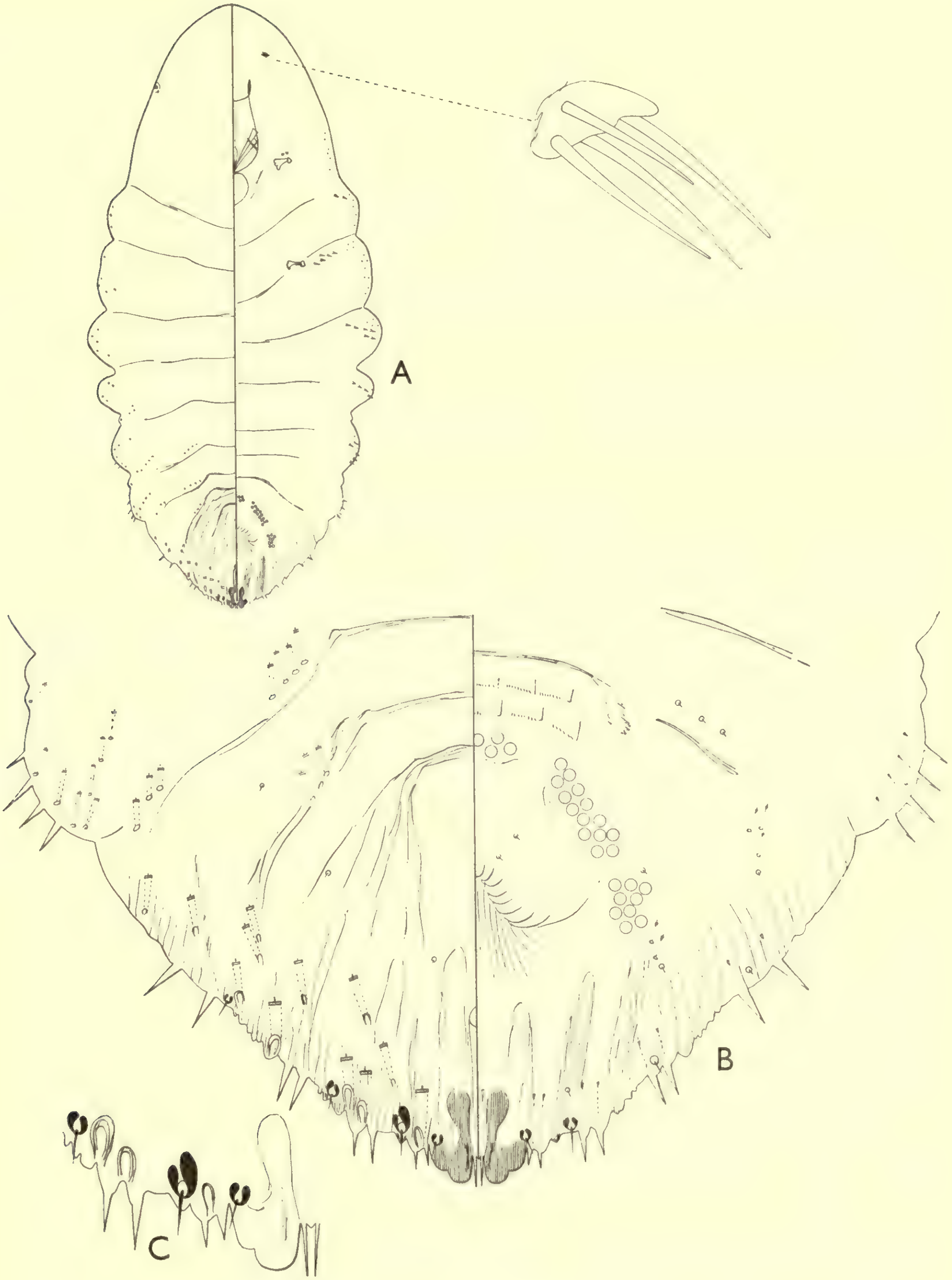

FIG. 11. *Caia quernea* sp. n.

situated about one quarter the length of pygidium from apex.

Pygidium with prominent median lobes each with one or two lateral notches but with parallel sides and with a large clavate paraphysis arising from the inner angle. Second and third lobes absent or at most represented by small sclerotized points. Seta on the margin of the seventh segment with the base heavily sclerotized and with the inner part of the socket large and extending into the pygidium. Gland spines in pairs on pygidium, those between median lobes very slender and about as long as lobes. Marginal macroducts numbering four pairs. Other dorsal ducts much smaller and becoming smaller anteriorly ; submedian group on segment six absent ; distinct submedian groups present on segments two, three and four ; submarginal groups present as far forward as the mesothorax.

Ventral surface with three groups of perivulvar pores, median group with 5–8 pores. Anterior lateral groups each with 11 or 12 pores, posterior lateral groups each with 8–12 pores. Microducts present around submargins and small gland spines in submarginal groups as far forward as mesothorax.

Holotype. ♀. West Pakistan : Mana, on *Quercus* sp. 28.ii.1960 (*S. K. Kazimi*) in British Museum (Nat. Hist.).

Paratypes. West Pakistan. 1 ♀ same data as holotype. 1 ♀. Berhain, on *Quercus* sp. 20.x.1961 (*S. K. Kazimi*) in British Museum (Nat. Hist.).

***METANDASPIS* gen. n.**

Type species : *Mytilaspis recurvata* Froggatt.

Female scale elongate, exuviae terminal. Male scale smaller, smooth.

A genus of the tribe Diaspidini and of the *Lepidosaphes* group with two-barred ducts, these minute and distributed in no definite arrangement on the pygidium ; marginal macroducts absent. Gland spines present, a pair of which lie between the median lobes. Anal opening at the base of pygidium. Median lobes prominent, triangular, the apical margin, at least, with numerous notches. Anterior spiracles with pores.

This genus comes close to the genus *Andaspis*, differing in lacking marginal macroducts which are replaced by minute ducts similar to the dorsal ducts. The shape of the median lobes appears to be variable but the lateral margin is diagonal to the longitudinal axis of the body.

Metandaspis recurvata (Froggatt) **(comb. n.)**

(Text-fig. 12)

Mytilaspis recurvata Froggatt 1914 : 683.

Scale of adult female elongate, white, often peculiarly bent, sometimes at right angles or even U-shaped.

Male scale white, similar to female but smaller, straight.

Adult female elongate, following in the same characteristic shape as the scale, membranous except for pygidium. Pygidium rounded. Lateral sclerotized spurs absent. Anterior spiracles each with usually a single pore.

Pygidium with median lobes prominent, the apical margin quite long and serrated, and with a slender paraphysis arising from near each basal angle. Second lobes well developed, bilobed, the inner lobules variously notched. Sclerotized projections present in the places of the third and fourth lobes. Gland spines present in pairs on pygidium, the pair between median lobes shorter than the lobes. Dorsal minute ducts distributed rather evenly on pygidium and in more or less transverse rows on fourth and fifth segments and around the submargins to metathorax ; ducts on pygidium each with sclerotized area surrounding orifice.

Ventral surface with microducts sparse on pygidium but more numerous around submargins. Perivulvar pores absent. Small gland spines present as far forward as metathorax.

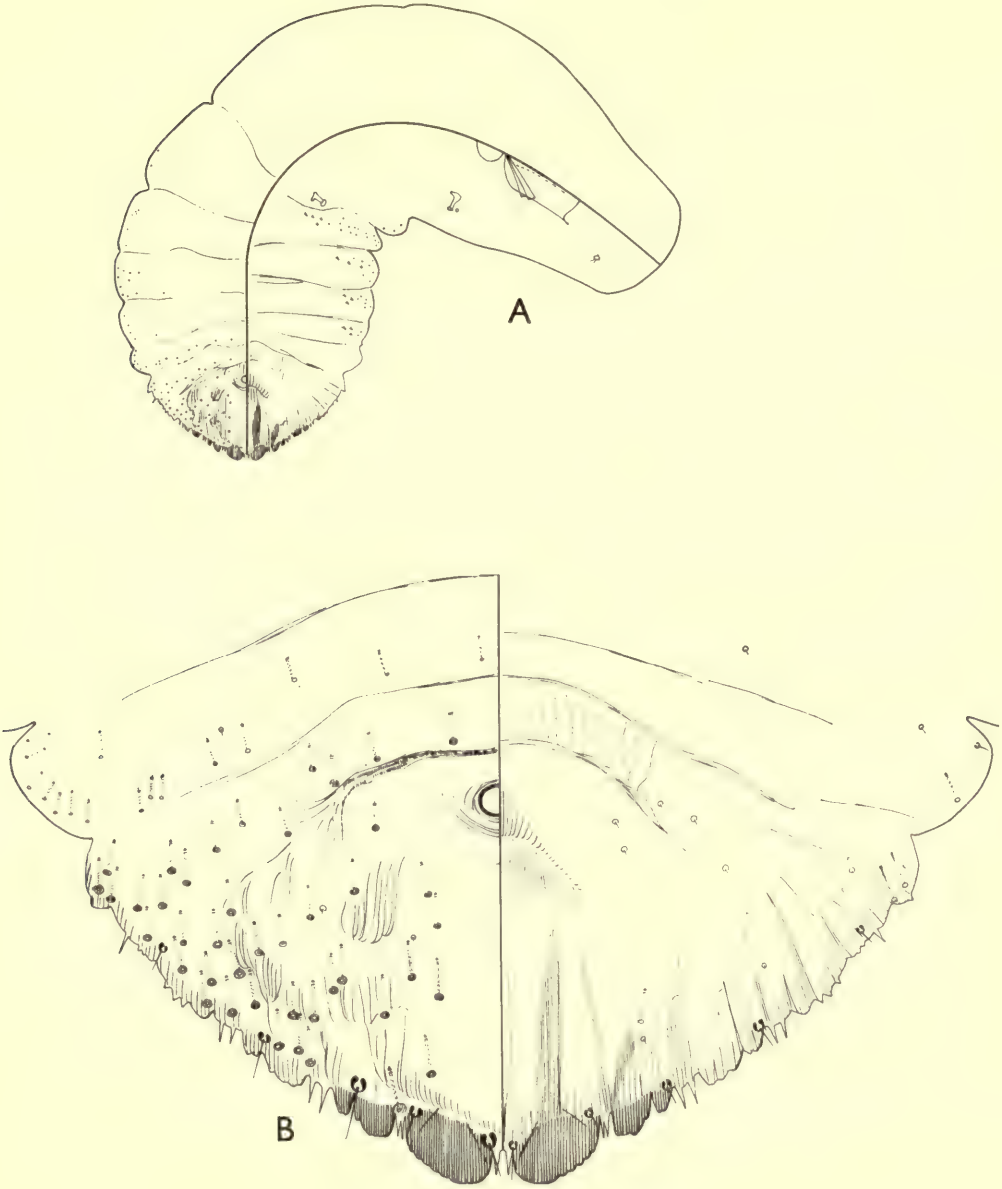

FIG. 12. *Metandaspis recurvata* (Froggatt)

Described from part of the original material, AUSTRALIA : New South Wales, Cowra, on branches and twigs of the Black Wattle, *Acacia decurrens* (Leguminosae), 7.vi.1900 (*W. W. Froggatt*).

Metandaspis javanensis **sp. n.**

(Text-fig. 13)

Scale of adult female white, smooth, elongate, about 1·5 mm. long but usually covered with reddish-brown matter.

Male scale similar but smaller.

Adult female elongate about 0·6 mm. long, sides subparallel. Body membranous except for pygidium but older individuals often sclerotized on head margin and in a characteristic pattern on the prepygidial abdominal segments. Without lateral sclerotized spurs but dorsal surface with submarginal tubercles which are rounded, blunt and sclerotized on first to sixth segments. Anterior spiracles with 2 or 3 pores.

Pygidium with very prominent median lobes departing from the usual shape of those of the *Andaspis* series in having inner and outer margins roughly equal in length but entire margins serrated ; ventral surface with well developed basal scleroses extending into pygidium and with paraphyses, the inner of which extends forwards near the midline. Second lobes smaller than median, with outer margins much longer than inner, serrated ; ventral side showing paraphyses. Gland spines very small, there being two between median lobes and arranged in pairs on remainder of pygidium. Dorsal ducts minute, numerous, in no definite arrangement on pygidium ; in transverse rows as far forward as metathorax.

Ventral surface with perivulvar pores in three groups arranged in a broad arc ; median group usually with two pores, laterals each with usually four pores. Microducts quite numerous in transverse rows on abdominal and thoracic segments.

Holotype. ♀. Java : without known locality, on *Pterospermum javanicum* (Sterculiaceae), (*A. Zimmerman*), in British Museum (Nat. Hist.).

Paratypes. 8 ♀. Java : same data as holotype, in British Museum (Nat. Hist.).

There is some doubt as to whether this species belongs to the same genus as the previous species. The very prominent median lobes are the chief distinguishing characters together with the peculiar paraphyses on the ventral surface and the large basal scleroses. Rather than erect a new genus it may remain here until further related species are discovered.

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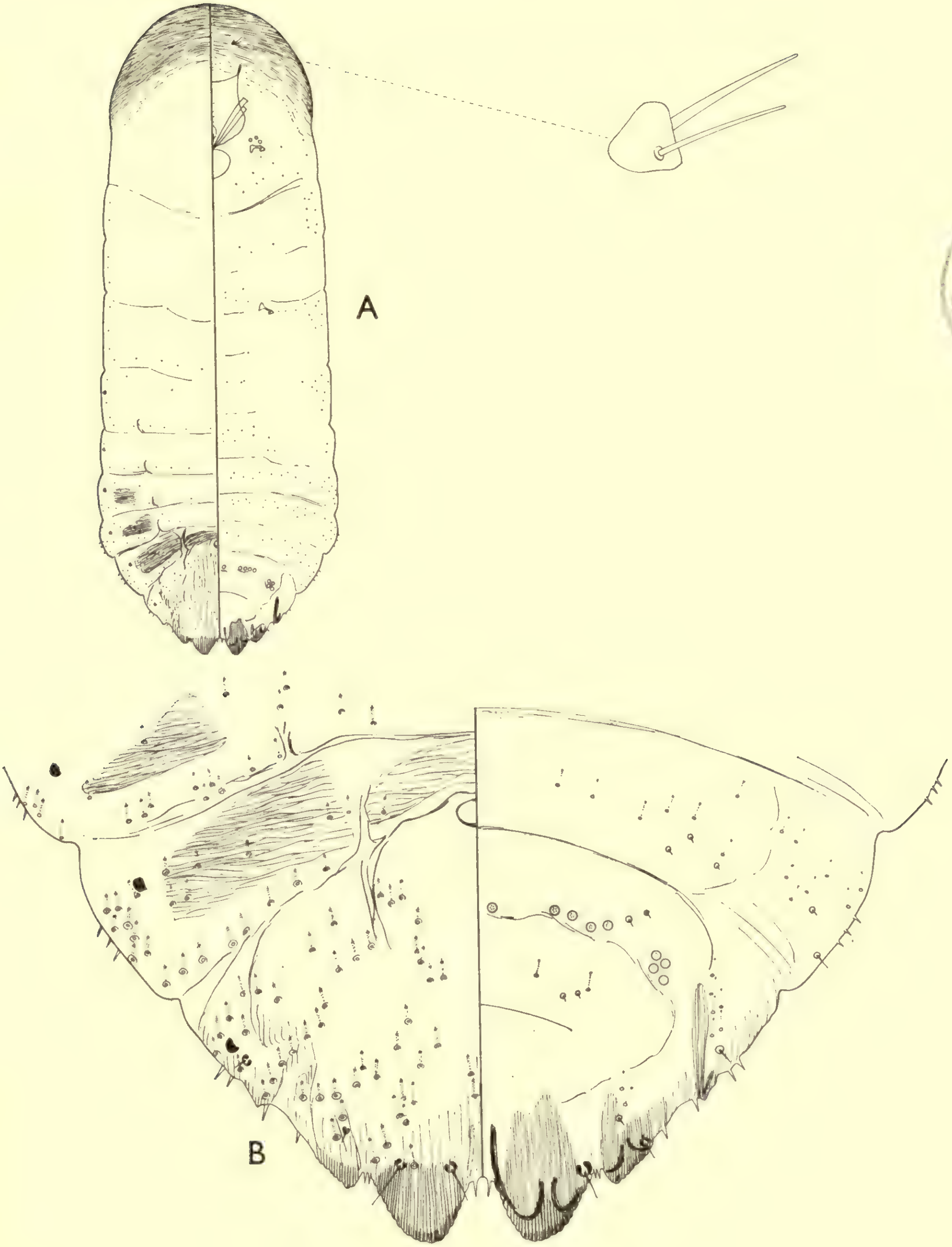

FIG. 13. *Metandaspis javanensis* sp. n.

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ON THE TRICHOPTERA OF NEPAL

D. E. KIMMINS

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ON THE TRICHOPTERA OF NEPAL

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BY

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British Museum (Natural History)

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THE BRITISH MUSEUM (NATURAL HISTORY)

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ON THE TRICHOPTERA OF NEPAL

By D. E. KIMMINS

SYNOPSIS

A study of the collections made by the two British Museum (Natural History) Expeditions to Nepal, 1954 and 1961–62, has resulted in a list of twenty-eight species, of which one genus and fourteen species are here described as new.

Both expeditions included an entomologist, Mr. J. Quinlan in 1954 and Mr. R. L. Coe in 1961–62, but in neither case were Trichoptera the sole object of their attentions. The present list can therefore be regarded only as a beginning, and specialised collecting, over a wider area, will undoubtedly result in a very much greater list. As far as I know, no previous list of Nepalese Trichoptera has been published. In addition to those included in the present list, two other species have already been described in manuscript by Dr. F. Schmid. The types of new species described in this paper are in the British Museum (Natural History). To save space, collector's initials only are given in the list, (*RLC*) = R. L. Coe and (*JQ*) = J. Quinlan.

Family **RHYACOPHILIDAE**

Rhyacophila* sp. n. *A

This species is being described by Schmid.
Taplejung Distr., Sangu, c. 6,200 ft., xi.1961–i.1962, 1 ♂ (*RLC*).
A female from Ulleri, 6–7,000 ft., 19.v.1954 (*JQ*), probably belongs here.

Rhyacophila* sp. n. *B

This species is also being described by Schmid.
Bahkri Kharka, 5,500 ft., 23.iv.1954, 1 ♂ (*JQ*).

Himalopsyche phedongensis Kimmins

Taplejung Distr., Dobhan, c. 3,500 ft., no date, 1 ♂ (*RLC*).
Previously recorded from Sikkim.

Himalopsyche digitata (Martynov)

Bahkri Kharka, 5,500 ft., 23.iv.1954, 1 ♂ (*JQ*).
Previously recorded from E. Himalayas, Darjeeling district.

Family **GLOSSOSOMATIDAE**

Agapetus triangularis Martynov

Arun Valley, below Tumlingtar, R. Sabhaya, c. 1,800 ft., 22.xii.1961, 1 ♂, 1 ♀, (*RLC*).
Previously recorded from Himalayas.

Synagapetus tamrangensis sp. n.

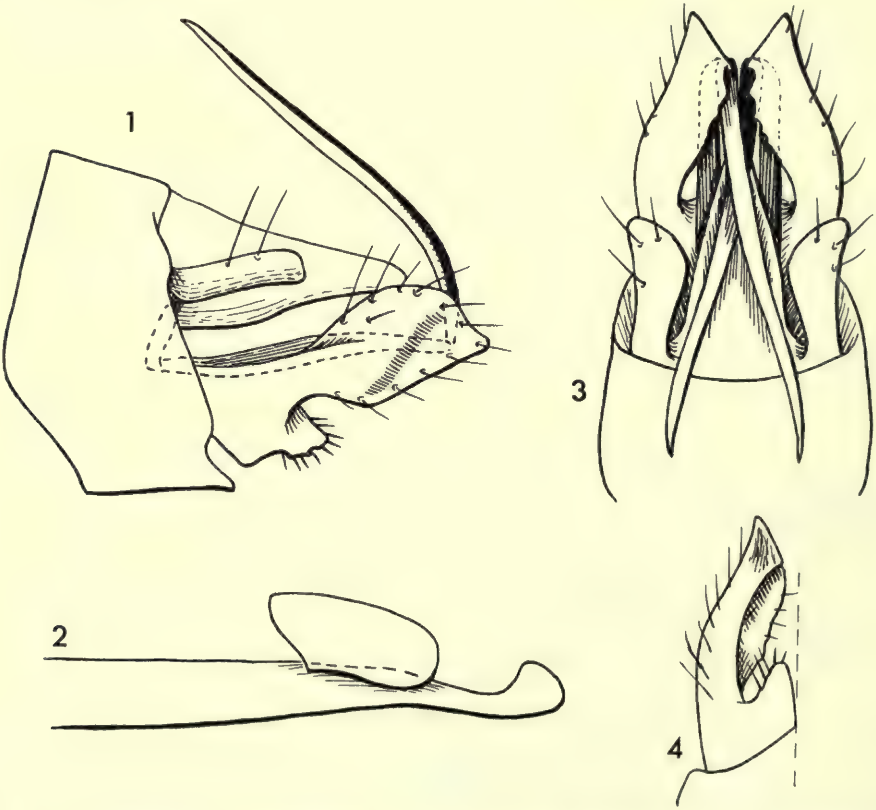
(Text-figs. 1–4)

♂. Blackish, with sparse fuscous pubescence on wings. In hind wing, R_1 terminates in Sc and is connected to R_{2+3} by a cross-vein. Base of fork R_4 beyond that of fork M_1.

♂ Genitalia. A short, blunt process to the sixth sternite. Ninth segment with apical ventral margin triangularly produced below the base of the claspers, appearing as a ventral process in side view. Tenth tergite about as long as claspers, forming a triangular hood in dorsal and lateral view, the lateral margins more sclerotized than the centre. Cercus a little more than half as long as tergite, digitate in side view, inner margin convex in dorsal view, apex a little out-turned. Arising from each lower basal angle of the tenth tergite is a long, two-segmented spine, the apical section folded forward over the tergite and, in the type, the two spines crossing each other. Aedeagus slender, with a clavate apex in side view. Above it is a small, saddle-shaped sclerite (? tenth sternite). Clasper of the pattern of *S. incurvatus*, the apical half more dilated in side view, upper margin more incurved, apex angular rather than rounded and with an oblique row of stout, comb-like teeth on the inner surface. The ventral branch more pronounced than in *incurvatus*.

♀ Unknown.

Length of fore wing, 4 mm.



Figs. 1–4. *Synagapetus tamrangensis* sp. n. ♂ Genitalia. 1, lateral ; 2, aedeagus and ? tenth sternite, lateral ; 3, dorsal ; 4, left clasper, ventral.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., i.1962 (*RLC*), BMNH.

This species is closely related to *S. incurvatus* Kimmins (Burma), differing in the longer cercus, which is more strongly convex on its inner surface, and in the details of the clasper, especially in the presence of a row of comb-like teeth on the inner surface.

A single female *Synagapetus* from Sangu may belong to this species, but as it comes from a different locality, it is left undetermined.

Nepaloptila coei gen. n., sp. n.

(Text-figs. 5–8)

♂. The holotype was not in good condition and has been mounted as a microscope preparation. The general colour was dark grey, with greyish pubescence on the wings. Spurs 0.4.4. Pronotum with the dorsal surface densely covered with erect, blackish, scale-like hairs. Two rounded warts present on mesoprescutum, two on mesoscutum (one on each side of scutellum), the latter without warts. Wings rather narrow, venation lightly sclerotized, cross-veins somewhat obscure. In fore wing, all five apical forks present, forks R_2 and R_4 very long and narrow, R_2 with a short footstalk, R_4 sessile. These two forks extend basally to the middle of the wing. The discoidal cell extends from the middle of the wing to within one fourth from the base. The media forks at about the middle of the wing, forks M_1 and M_3 stalked. Veins Cu_1 and Cu_2 run separately into the wing margin, fork Cu_{1a} sessile. Vein Cu_2 with a row of stout setae about midway on the under surface. Hind wing with R_1 terminating in Sc, a faint cross-vein between it and R_{2+3}. Apical forks R_4 and M_1 stalked, Cu_{1a} sessile.

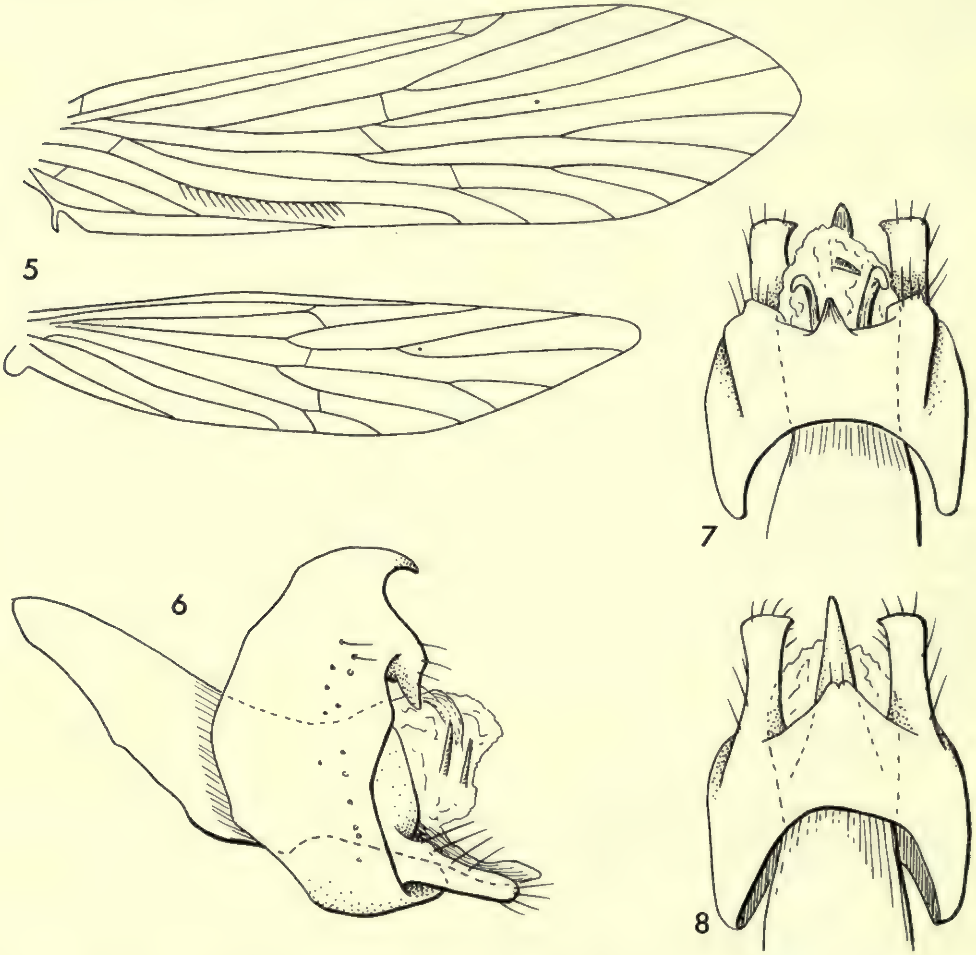
♂ GENITALIA. Process of the sixth sternite slender, slightly clavate apically in side view. Ninth segment with the centre of its dorsal apical margin produced in a strong, triangular tooth, curving slightly downwards. Tenth segment fused to ninth, appearing as a pair of short, downwardly directed processes, one arising from each upper lateral margin of the ninth segment. Aedeagus long, stout basally, its apex tapering to an acute point and with its dorsal surface before the apex bearing some inflated membrane, within which are two curved, sclerotized rods and some spines. Claspers fused to ninth segment, broad at base in side view, extending in a digitate process, whose apex is slightly dilated in ventral view, the inner apical angle toothed. Between the claspers, the margin of the ninth sternite is produced in a broad triangle, whose apex is bilobed slightly, each lobe terminating in a seta.

♀ Unknown.

Length of fore wing, ♂, 2·5 mm.

Holotype ♂ (mounted as microscope preparation), Arun Valley, below Tumlingtar, R. Sabhaya, west shore, c. 1,800 ft., on dead leaves lying in sun on sandy shore, 22.xii.1961 (*RLC*), BMNH.

The holotype has very much the appearance of a small *Agapetus*, but it has been placed in the Protoptilinae on the absence of mesoscutellar warts, the presence of rounded warts on the mesoscutum and the presence of stout setae on Cu_2 in the fore wing. The venation recalls that of the Agapetinae, but in this subfamily stout setae on or near Cu_2 in the fore wing are unknown and there are always warts on the mesoscutellum. Apical fork Cu_{1a} is usually lacking in the Protoptilinae, where Cu_1 and Cu_2 often fuse apically in the fore wing, although they are separate in *Matrioptila*. The general plan of the venation is otherwise like that of *Matrioptila* and the male genitalia also show some resemblance. In its retention of fork Cu_{1a} in the fore wing, *Nepaloptila* would appear to be more primitive than *Matrioptila*, and this makes its discovery in Asia a matter of some interest, since all previous records of Protoptilinae are from the New World. The presence of warts on the mesoscutellum has been listed by Ross (1956) as one of the characters of a primitive caddisfly ; these warts occur in the Agapetinae and are lacking in the Protoptilinae.



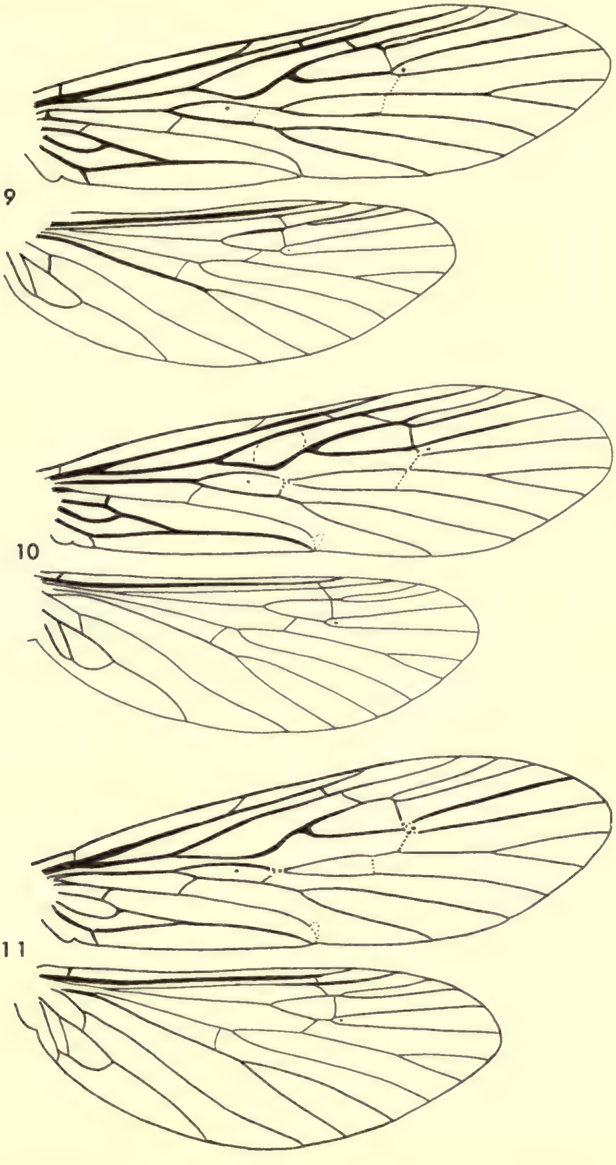
FIGS. 5–8. *Nepaloptila coei* gen. sp. n. ♂. 5, wings ; 6, genitalia, lateral ; 7, dorsal ; 8, ventral.

Family **PHILOPOTAMIDAE**

***Chimarra nepalensis* sp. n.**

(Text-figs. 9, 12–17)

♂. Head and thorax piceous above, with black and greyish hairs, thorax beneath and legs fuscous. Antennae and palpi piceous. Abdominal segments bright yellow, genital capsule



FIGS. 9–11. *Chimarra* spp. n. Wings. 9, *C. nepalensis* ; 10, *C. fenestrata* ; 11, *C. nigra*.

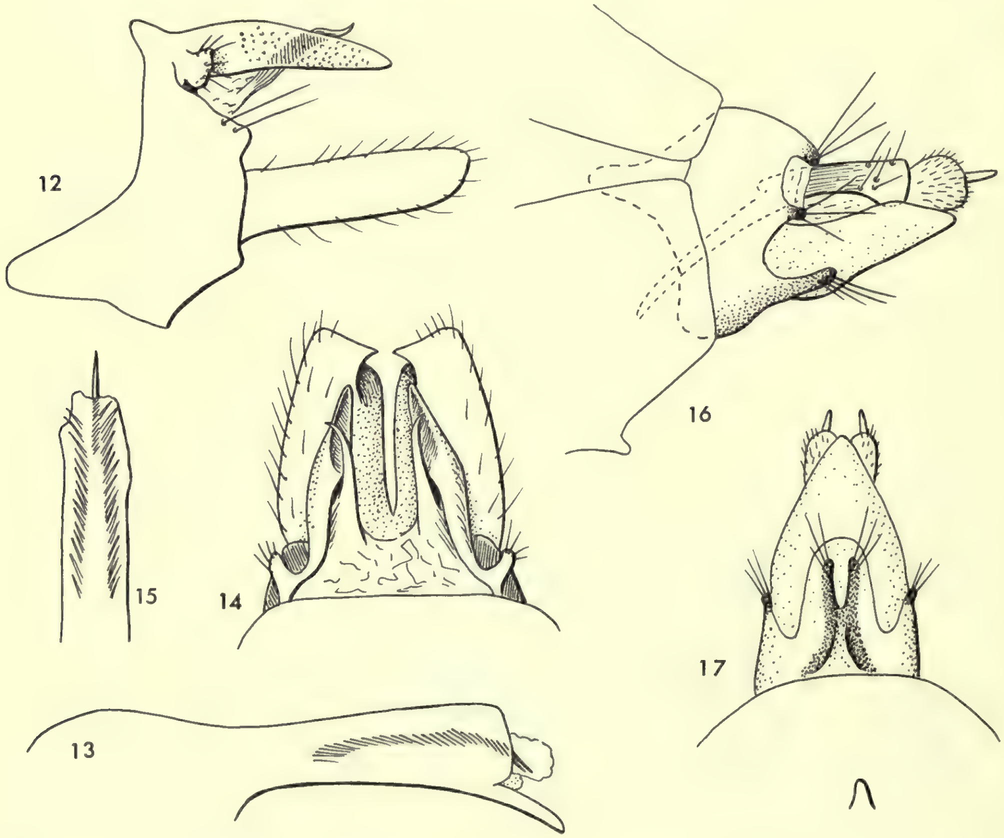
piceous. Wings dark fuscous to piceous, with fuscous pubescence. In fore wing, the discoidal cell is about as long as median cell, rather broader, tapering slightly to a blunt base. *Rs* strongly bent towards *M*. Apical fork R_2 very narrow. In hind wing, apical fork R_2 is also narrow and with a short footstalk.

♂ Genitalia. Very similar to *C. khasia* Kimmins, the lobes of the tenth segment and the claspers almost indistinguishable. The inner branch of the tenth segment differs somewhat, being more slender, not blade-like and its apex not bifid. The lower apical margin of the aedeagus is produced in a slender spine and within the basal sleeve are two parallel rows of stout spines, directed outwardly in dorsal aspect.

♀ Genitalia. A small process situated near the centre of the seventh sternite. Eighth segment synscleritous, with three pairs of hair-tufts, two dorsal, two lateral and two ventral. The segment around their bases more heavily pigmented, the pigmentation around the ventral ones more extensive, reaching almost to the base of the segment. Between the ventral tufts, a hyaline area gives the impression of a narrow excision. The apical margin of the eighth sternite is extended in a boat-shaped subgenital plate, its apex exceeding the apex of the ninth segment.

Length of fore wing, ♂, 6·5 mm., ♀, 7 mm.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., Sangu,



Figs. 12–17. *Chimarra nepalensis* sp. n. Genitalia. 12, ♂, lateral ; 13, ♂, aedeagus, lateral ; 14, ♂, dorsal ; 15, ♂, aedeagus, dorsal ; 16, ♀, lateral ; 17, ♀, ventral.

c. 6,200 ft., mixed vegetation by stream in gully, xi.1961–i.1962 (*RLC*), BMNH.

Allotype ♀ (pinned, abdomen cleared and in glycerine), data as holotype ♂ (*RLC*), BMNH.

Paratypes (pinned), same data as holotype, 4 ♂, 5 ♀; 16–29.x.1961, 1 ♂; Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961, 1 ♀; between Sangu and Tamrang, deep river gorge, c. 5,200 ft., 1.i.1962, 2 ♂ (*RLC*), BMNH.

This species differs from *C. khasia* Kimmins in the more quadrangular discoidal cell and more strongly arched *Rs* in fore wing and in the simple, spiniform branch to the tenth segment, the aedeagus with two parallel rows of spines and a spiniform production of its apex and the more acutely pointed inner apical angles of the claspers in dorsal view. The female of *C. khasia* is not known.

Chimarra fenestrata **sp. n.**

(Text-figs. 10, 18–19)

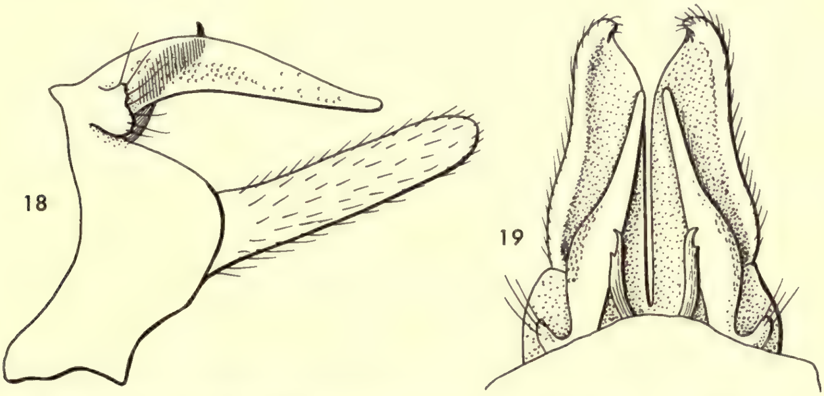
♂. General coloration much as in *C. nepalensis* sp. n., but with a definite hyaline window in the radial area of the fore wing, between the origin of *Rs* and the base of the discoidal cell, and a less defined hyaline patch in the radial area of the hind wing. Venation much as in *C. nepalensis* but apical fork R_2 is broader in both wings. Apex of fore wing less acute. Abdomen yellow, tergites with a fuscous tinge in some examples.

♂ Genitalia. Of the same general pattern as *C. khasia* and *C. nepalensis*. In side view, the lateral margins of the ninth segment are evenly rounded, not angled as in *nepalensis*. The lobes of the tenth segment are longer, narrower and more downwardly arched, converging somewhat apically. The inner branch of the tenth tergite is stouter, its apex angled abruptly upwards and with a small, subapical tooth in dorsal aspect. Aedeagus much as in *C. nepalensis*. Clasper longer and narrower in lateral aspect, its apex in dorsal view tapering to a small hook, not truncate as in *nepalensis*.

♀. Two females provisionally associated with the males agree in the hyaline pattern of the wings but the female genitalia show no appreciable difference from *nepalensis*.

Length of fore wing, ♂, 5 mm., ♀, 7 mm.

Holotype ♂ (pinned, one pair of wings mounted dry, abdomen in glycerine), Taplejung Distr., Sangu, c. 6,200 ft., mixed vegetation by stream in gully, xi.1961–i.1962 (*RLC*), BMNH.



Figs. 18–19. *Chimarra fenestrata* sp. n. ♂ Genitalia. 18, lateral; 19, dorsal.

Paratypes (pinned), same data as holotype, 1 ♂; Dobhan, east bank of R. Tamur, c. 3,500 ft., mixed vegetation by stream in deep gully, i–ii.1962, 1 ♂ (*RLC*), BMNH.

The two females provisionally associated with the holotype have the same data as that specimen.

This species is very closely allied to *C. nepalensis* and had there been only a single example, one might easily have considered it to be a variety. There are however eight males of *nepalensis* and three of *fenestrata* and there does not appear to be any intergrading between them, even in the same locality. There is no indication whether there was any difference in the emergence time of the two species in this locality. The differences in structure are listed in the above comparative description.

***Chimarra nigra* sp. n.**

(Text-figs. 11, 20–23)

General colour black or very dark grey, abdomen pale fuscous or dull orange. Wings with sparse blackish pubescence. In the fore wing, *Rs* arises at the level of the fork of *M* and Cu_1, running close to the thyridial cell, then curving sinuously to the base of the discoidal cell. The latter is clearly beyond the base of the median cell. Hind wing much as in *C. nepalensis*.

♂ GENITALIA. Ninth segment with lateral margins rather abruptly angled in side view above the claspers. Sternite with a prominent ventral process. Tenth segment divided into two lateral lobes, each with an inner, digitate branch about two-thirds as long as lobes, straight in dorsal view, slightly arched near base in side view. Lobes in side view stout, somewhat quadrate, upper margin convex, lower apical angle produced. External surface convex, with numerous minute setae arising from small, raised bases. From above the lobes are broad basally, tapering towards apices, which are angled inwards. At the base of the lobe arises a small setiferous wart, fused to the margin of the ninth segment, possibly a reduced cercus. Aedeagus with a simple basal sleeve, within which is membrane and a few, very slender, curved spines. Claspers stout, extending beyond apices of tenth segment, more or less parallel-sided in lateral view. From beneath, the inner margin is sinuous, inner apical angle produced inwards in an acute tooth.

♀ Unknown.

Length of fore wing, 5·5 mm.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961 (*RLC*), BMNH.

Paratypes ♂ (1 pinned, 1 in glycerine), same data.

In male genital structure, this species resembles *C. fusca* Kimmins (Assam), but differs in details. The tenth segment is shorter and stouter and the inner branch is straighter. The lateral margin of the ninth segment is angularly produced and stouter in lateral view, its inner apical angle is more strongly produced and the inner ventral margin more strongly sinuous.

***Chimarra biungulata* sp. n.**

(Text-figs. 24–26)

Head and antennae dark fuscous, the latter obscurely annulated with paler fuscous. Palpi fuscous. Thorax and legs fuscous. Wings pale fuscous, much denuded, venation darker, except the cross-veins closing the discoidal and median cells, the radio-medial cross-vein, the stem of *M* basad of median cell and the arculus, which are whitish in the fore wing. *Rs* in fore wing scarcely sinuate. Fork Cu_{1a} short, extending only a little basad of cross-vein closing median cell. Thyridial cell long and narrow.

♂ GENITALIA. Apical margin of eighth tergite spinose, sternite with a process at centre of apical margin. There is also a ventral process in the centre of the ninth sternite. Tenth tergite forming a pair of lateral plates, one on each side of the aedeagus, lateral margins in the apical half produced outwards in two teeth, the apical ones the smaller. Cercus short, digitate. Aedeagus cylindrical, with a pair of slender, spine-like parameres and with a pair of stout claws extruded from the membrane at the apex. Claspers caliper-like in ventral view, strongly widened in basal half, inner margin serrate, with a rounded upper lobe. Apex of clasper densely spinose on outer surface.

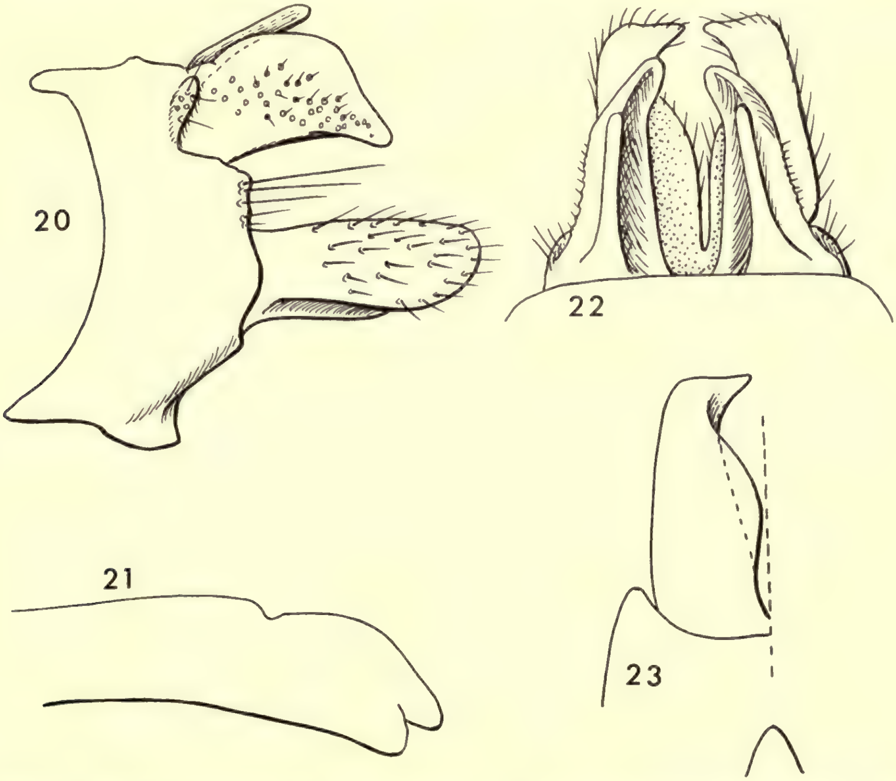
♀ Unknown.

Length of fore wing, 4·3 mm.

Holotype ♂ (pinned, with abdomen in glycerine), Taplejung Distr., river bank below Tamrang Bridge, c. 5,500 ft., x–xi.1961 (*RLC*), BMNH.

Paratype (pinned), Taplejung Distr., Sangu, c. 6,200 ft., 22.xi.1961, mixed plants by deep cliff in river gorge, 1 ♂ (*RLC*), BMNH.

This species appears to be related to *C. sepulcralis* Hagen (Ceylon). The tenth tergite has the two pairs of lateral teeth closer together in the apical half. The



FIGS. 20–23. *Chimarra nigra* sp. n. ♂ Genitalia. 20, lateral ; 21, aedeagus, lateral ; 22, dorsal ; 23, left clasper, ventral.

aedeagus has the two parameres or spines, but these are more nearly equal in length and the apical hooks are larger. The claspers are more strongly incurved in ventral view, more strongly dilated in basal half and with the apex more strongly setose.

Chimarra suryasena Schmid

Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961, 2 ♂, 1 ♀ (*RLC*).

Previous distribution, PAKISTAN, N.W.F.P., Balakot.

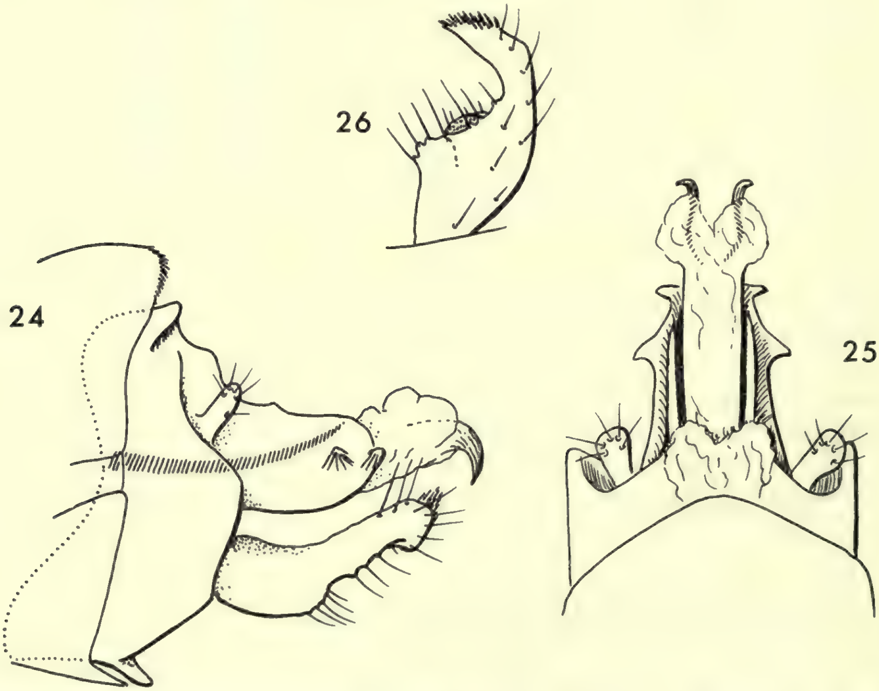
Chimarra spp. indet.

Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961, 1 ♀ (*RLC*).

Arun Valley, below Tumlingtar, R. Sabhaya, west shore, c. 1,800 ft., 9–17.xii.1961, 1 ♀ (*RLC*).

Dolophilodes rossi Kimmins

Bakhri Kharka, 5,500 ft., 23.iv.1954, 1 ♂ (*JQ*).
Previous distribution, N.E. Burma (Kambaiti).



FIGS. 24–26. *Chimarra biungulata* sp. n. ♂ Genitalia. 24, lateral ; 25, dorsal ; 26, right clasper, ventral.

Family **POLYCENTROPODIDAE**

Dipseudopsis sp.

Phewa Tal, near Pokhara, 2,500 ft., 10.iv.1954, 2 ♀ (*JQ*).

Family **STENOPSYCHIDAE**

Stenopsyche griseipennis McLachlan

Arun Valley, below Tumlingtar, R. Sabhaya, west shore, c. 1,800 ft., 1 ♂, 1 ♀ (*RLC*) ; Tumlingtar, bare rocky slopes above R. Sabhaya, west bank, c. 1,900 ft., 8–24.xii.1961, 1 ♂ (*RLC*).

Distribution. INDIA (Masuri, Simla) ; SIKKIM (Phedong) ; N. BURMA (Mishmi Hills).

Family **HYDROPSYCHIDAE**

Macronema fastosum Walker

Taplejung Distr., Sangu, c. 6,200 ft., mixed vegetation by stream in gully, ix–x.1961, 1 ♀ (*RLC*).

A very variable species, ranging over INDIA, MALAYA, CHINA, FORMOSA, and BORNEO.

Diplectrona sanguana **sp. n.**

(Text-figs. 27–29)

♂. Head fuscous, with dark fuscous hairs and sparse golden pubescence. Antenna with two basal segments fuscous, remaining segments pale fuscous with fulvous articulations. Palpi fuscous. Thorax dark fuscous. Legs pale fuscous, median and posterior tibiae rather darker. Wings with smoky brown membrane, the fore wing covered with fuscous and golden pubescence, the latter forming numerous small speckles. Hind wing with sparse fuscous pubescence. The venation of the fore wing agrees with Martynov's description of *D. marginata* (Betten), but in the hind wing fork R_2 is twice as long as its footstalk and fork Cu_{1a} is relatively shorter and broader.

♂ GENITALIA. A pair of internal bodies opening on the intersegmental membrane between the seventh and eighth segments. Ninth segment with its lateral margin produced in a triangular lobe in the lower half, forming a groove into which fits the basal segment of the clasper. Tenth segment fused to ninth, forming a pair of spreading, rounded lobes in dorsal view, and each bearing on its dorsal surface a raised, rounded wart, covered with setae. Between the lobes are a pair of downwardly directed, digitate processes. Aedeagus dilated apically, bearing two pairs of tapering processes and, within its apex, a small transverse plate. Terminal segment of clasper slender, incurved and acute at its apex.

♀ Unknown.

Length of fore wing, 7 mm.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., Sangu, c. 6,200 ft., by rocky stream, 7–16.x.1961 (*RLC*), BMNH.

Paratypes (pinned), same data, 9 ♂, BMNH.

This species is related to *Diplectrona marginata* (Betten) Martynov, 1935 and to *D. burha* Schmid, but differs from them in the rounded lobes of the tenth tergite and in the more hooked and acute terminal segment of the clasper, and from *D. burha* also in the narrow median processes of the tenth segment.

Family **HYDROPTILIDAE**

Madioxyethira nepalensis **sp. n.**

(Text-figs. 30–34)

♂. General colour blackish, tips of antennae pale. Spurs apparently 0.2.4, but microscopic examination reveals a minute, rounded apical spur on the anterior tibia. Wings densely hairy, entirely blackish ; venation obscure but apparently much as in *M. milinda* Schmid.

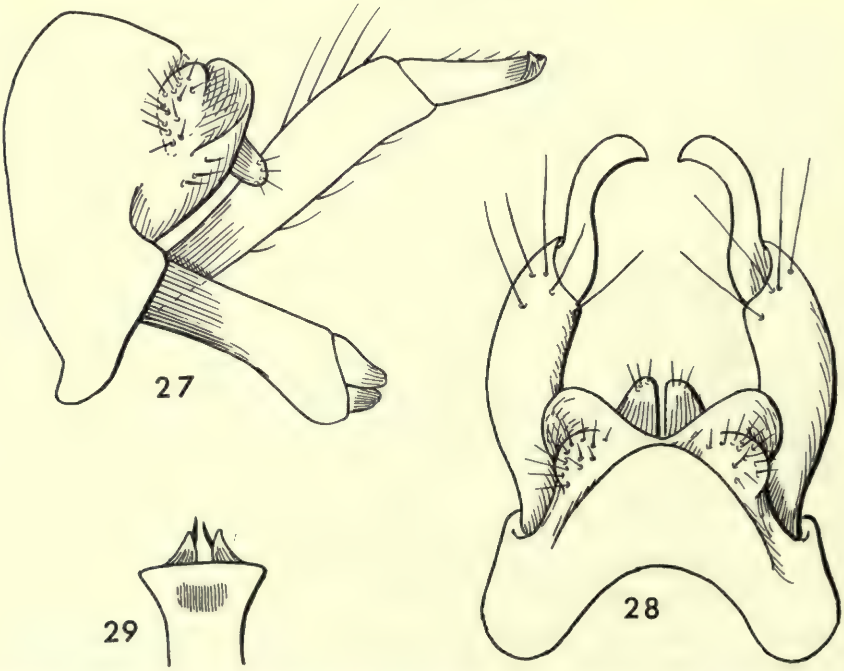
♂ Genitalia. Following the general pattern of *M. milinda* but differing in the following points. Basal apodeme of ninth tergite longer, about two and a half times as long as tergite and extending to base of the seventh segment. Lower apical angle of ninth tergite produced obliquely downwards and basally as a narrow, pigmented rod, finely denticulated on its ventral surface. Tenth segment lightly sclerotized. Claspers in side view tapering to a rounded apex, ventral margin less convex than in *milinda*, and lacking the dorsal tooth. From beneath, the apical part of the claspers are less divergent and the basally produced part is less dilated. The The aedeagus is more complex apically, being divided into two narrow, foliate lobes and two narrow divergent spines. In the holotype preparation, the aedeagus has rotated on its longitudinal axis through 90°.

♀ Unknown.

Length of fore wing, ♂, 2 mm.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., Sangu, c. 6,200 ft., mixed vegetation by stream in gully, xi.1961–i.1962 (*RLC*), BMNH.

The characters separating this species from *M. milinda* are set out in the above description. I differ from Schmid in my interpretation of the structure which he



Figs. 27–29. *Diplectrona sanguana* sp. n. ♂ Genitalia. 27, lateral ; 28, dorsal ; 29, apex of aedeagus, ventral.

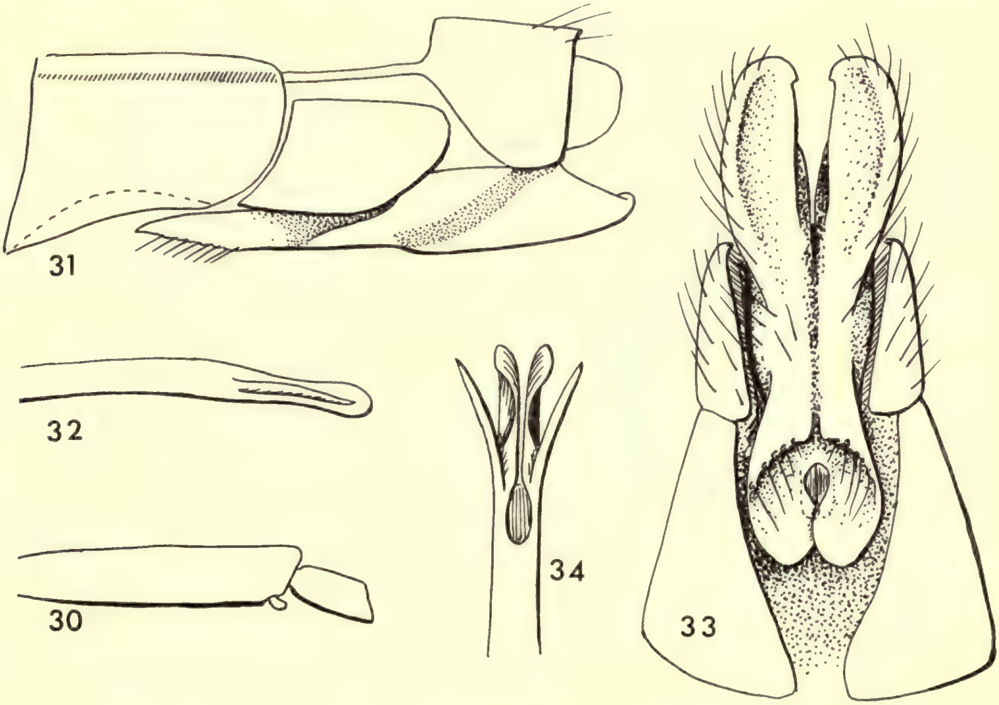
terms " bourrelet bombé ". He describes it as a prolongation of the tenth tergite, whereas in *nepalensis* this structure is more slender and appears to be a prolongation of the lower apical angle of the ninth tergite. The very curious structure described as " claspers " may possibly arise from a fusion of the eighth and ninth sternites and claspers. It certainly appears to be attached to the eighth and ninth segments. The discovery of a second species of *Madioxyethira* confirms Schmid's belief that it is a distinct genus.

Stactobia schmidi **sp. n.**

(Text-figs. 35–37)

The unique male was in poor condition and much denuded and has been made into a microscope preparation. All that one can say of its general appearance is that it was blackish and that the spur formula is 1.2.4.

♂ GENITALIA. A long ventral process to the seventh sternite. Eighth sternite with a median, V-shaped membranous area at its apical margin, fringed with long setae. Ninth tergite nearly three times as long as deep, the centre of its apical margin triangularly produced and the lateral margins of the tergite still further produced as triangular side-pieces, each bearing two stout, socketted spines, the upper the larger. Ventral surface of ninth tergite membranous, at its base two small, narrow claspers, about one fourth as long as tergite, each with a triangular projection on inner margin near apex. Tenth segment forming a pair of narrow lobes, directed



FIGS. 30–34. *Madioxeythira nepalensis* sp. n. ♂. 30, apex of anterior tibia ; 31, genitalia, lateral ; 32, aedeagus, lateral ; 33, genitalia, ventral ; 34, aedeagus, ventral.

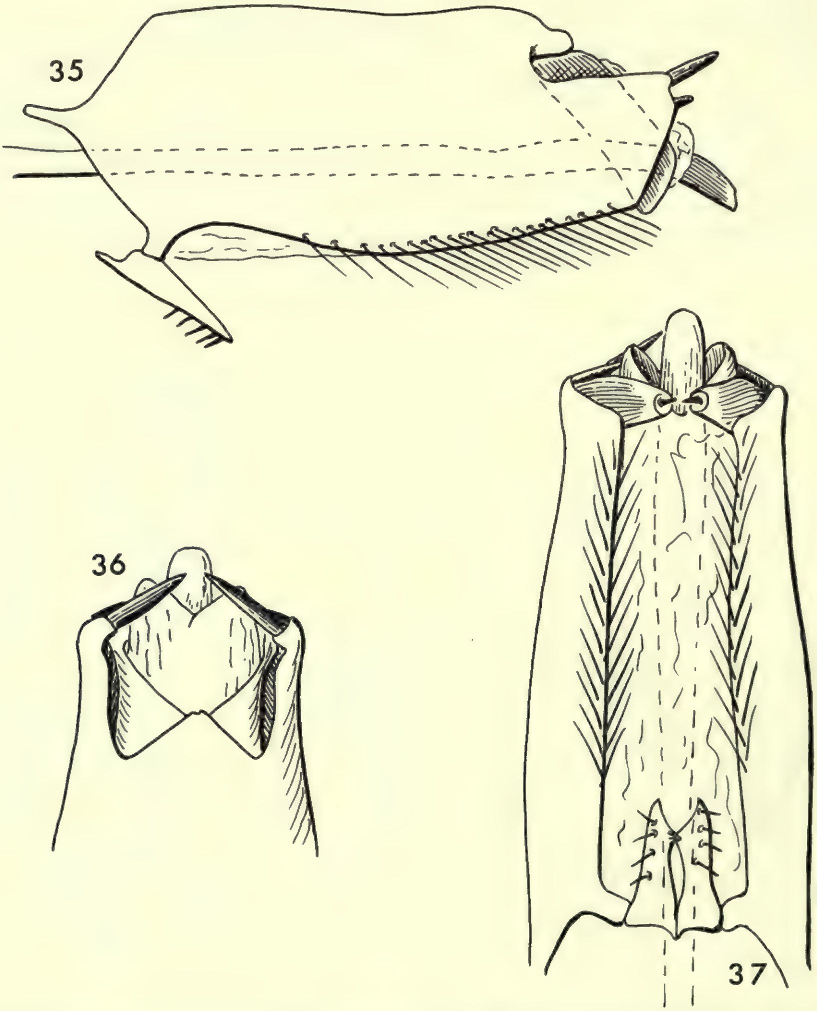
obliquely downwards and partly encircling the aedeagus, the apex of each lobe with a short, black spine, set in a cup-like base. Aedeagus slender, as long as sixth to ninth segments, apparently without parameres.

♀ Unknown.

Length of fore wing. 3·2 mm.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., Dobhan, c. 3,500 ft., shady places on shrubby slope above R. Tamur, 21–27.i.1962 (*RLC*), BMNH.

This species differs from all those figured by Schmid in his revision of *Stactobia* in the very long ninth tergite. The elongation occurs beyond the attachment of



Figs. 35–37. *Stactobia schmidi* sp. n. ♂ genitalia. 35, lateral ; 36, dorsal ; 37, ventral.

the claspers and, as the distance between this point and the origin of the basal apodeme is short, the claspers are almost at the base of the ninth segment.

Hydroptilidae ♀♀, sp. indet.

Taplejung Distr., Dobhan, c. 3,500 ft., shady places on shrubby slope above R. Tamur, 21–27.i.1962, 1 ♂; spray-splashed rocks in R. Maewe, 25.i.1962, 3 ♀ (*RLC*).

Arun Valley, below Tumlingtar, R. Sabhaya, west shore, c. 1,800 ft., 22.xii.1961, 1 ♀ (*RLC*).

Family **PHRYGANEIDAE**

Eubasilissa maclachlani (White)

Siklis, 7,000 ft., 22.iv.1954, 1 ♀ (*JQ*).
Distribution. HIMALAYAS.

Family **LIMNEPHILIDAE**

Pseudostenophylax himalayanus Martynov

Bakhri Kharka, 5,500 ft., 23.iv.1954, 1 ♂ (*JQ*).
Previous distribution. TIBET, SIKKIM.

Family **ODONTOCERIDAE**

Psilotreta quinlani **sp. n.**

(Text-figs. 38–43)

Head fuscous, with castaneous hairs. Antennae fuscous, with coppery pubescence basally, gradually shading into cream (apex missing). Palpi fuscous, with fuscous and greyish pubescence. Thorax fuscous, with castaneous hairs. Legs fuscous, with dense coppery pubescence, the membrane in the anterior portion of the fore wing with faint hyaline speckles and the apical part of the costal and subcostal areas hyaline. Venation normal for the genus. Apical fork R_2 overlapping the apical half of the disocidal cell in both wings of both sexes. In the male fore wing, the stems of M_1 and vein Cu_2 are more or less obsolete, M_{3+4} fused with Cu_{1a}. In the female fore wing, the stem of M is weak, fork M_1 is present and M_{3+4} separate from Cu_{1a}. Cu_2 is weak and fuses with $1A$ apically. The male wings are shorter and more rounded apically than in the female.

♂ GENITALIA. Ninth sternite with obtuse side-pieces. Tenth segment fused to ninth, the median portion triangularly produced, terminating in a cordate lobe. Lateral lobes fused to median, apex terminating in a spirally-coiled process, and with a thin, bifid plate arising at the base of the process, directed basally and upwards. Cerci nearly as long as the tenth tergite, narrowly foliate. Aedeagus stout, membranous apically, enclosing two or three curved spines. Claspers two-segmented, basal segment stout, about as long as tenth tergite, from beneath slightly sinuous, second segment barely one-fourth as long as basal, narrow, apex denticulate.

♀ GENITALIA. Ninth and tenth tergites fused to make a large hood, triangular from the side, with the apex obliquely truncate. From beneath, the lateral margins are incurved to form two rounded lobes. There is a parabolic subgenital plate, attached by its basal angles to the lower corners of the ninth tergite and only membranously linked to the eighth sternite. The subgenital plate is unpigmented along its median line.

Length of fore wing, ♂, 9·5 mm., ♀, 13 mm.

Holotype ♂ (mounted as microscope preparations), Ulleri, 6–7,000 ft., 19.v.1954 (*JQ*), BMNH.

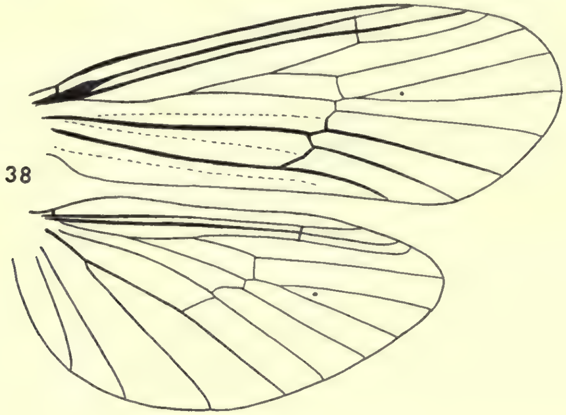
Allotype ♀ (pinned, one pair of wings and abdomen mounted as microscope preparations), same data, BMNH.

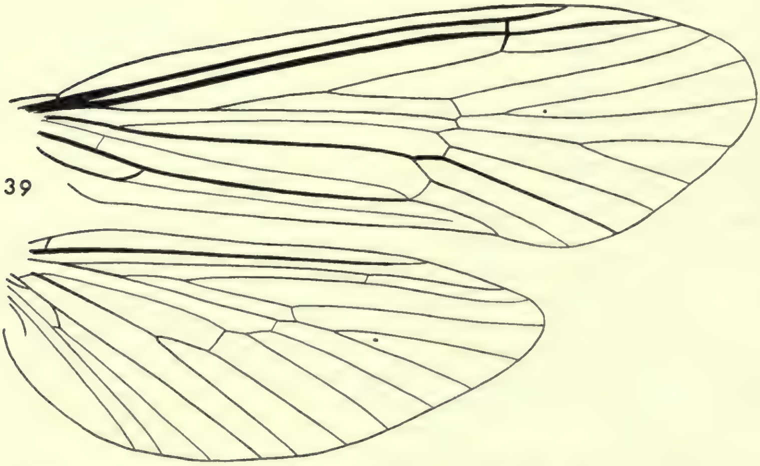
Paratype ♀ (pinned), same data, BMNH.

In the structure of the tenth segment, this species somewhat resembles *Psilotreta orientalis* Chi-ling. The apices of the lateral lobes bear similar curled spines but of a different shape. The cerci are stouter and the claspers are more sinuous in side view and the terminal segment is not bifid. The wing venation of *orientalis* (if correctly drawn) is quite different, as the discoidal cell on both wings appears to be open or lacking.

Marilia sp.

Taplejung Distr., Sangu, c. 6,200 ft., mixed vegetation by stream in gully, ix–x.1961, 2 ♀ (*RLC*).





FIGS. 38–39. *Psilotreta quinlani* sp. n. Wings. 38, ♂; 39, ♀.

In the absence of males, these two specimens are left with a generic determination only. Several species have been described from China, based upon males only, and since there is a sexual dimorphism in the venation, it is preferable to wait until males are available.

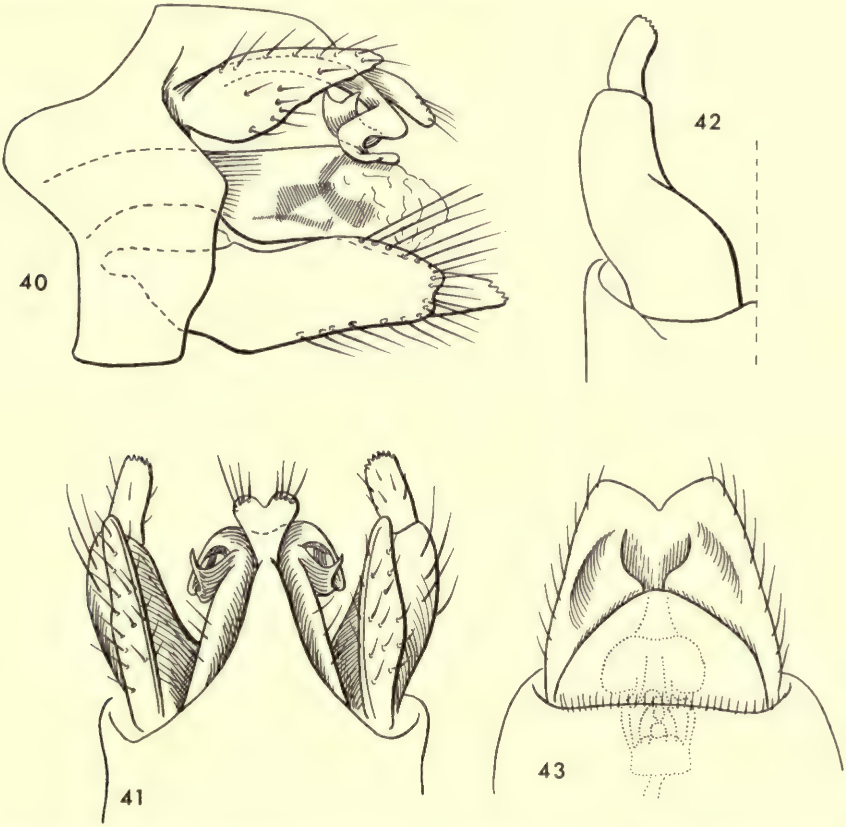
Family **LEPTOCERIDAE**

Adicella trifida Kimmins

Adicella trifida, Kimmins, 1963, *Bull. Brit. Mus.* (*Nat. Hist.*), *Ent.* **14** (6) : 10, figs. 24-29

Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., ix–x.1961, 1 ♂ (*RLC*).

The type and allotype of this species were taken in N.E. BURMA (Kambaiti). This specimen is a little smaller and differs slightly in genitalia, but the differences do not amount to more than individual variation.



FIGS. 40–43. *Psilotreta quinlani* sp. n. 40, ♂ genitalia, lateral ; 41, ♂ dorsal ; 42, ♂ left clasper, ventral ; 43, ♀ genitalia, ventral.

Family **UENOIDAE (=THREMMIDAE)**

Uenoa hiberna **sp. n.**

(Text-figs. 44–47)

♂. Head fuscous, with golden pubescence ; only two ocelli. Antennae fuscous, with golden pubescence. Maxillary palp single-segmented, slender, reaching almost to the base of the antenna. Thorax fuscous, with golden and fuscous hairs. Legs tawny, with golden and fuscous pubescence, spurs fuscous. Wings smoky hyaline, with darker venation, bearing long, semi-erect setae. In the fore wing, the discoidal cell is relatively longer and narrower than in *U. burmana* (Mosely). The hind wing is more acute at the apex.

♂ GENITALIA rather like that of *U. burmana*. The inner lobes of the tenth segment are shallowly excised at their apices, the inner apical angles in side view giving the appearance of a small, downturned hook. The outer lobes (? cerci) are more quadrate in side view and arise from a more slender stem. The aedeagus in dorsal aspect is dilated in its basal half, the apical half slender and spiniform. Parameres stout, sinuous in dorsal aspect, slightly exceeding the aedeagus, upper surface towards tip granulose. Fused claspers forming a quadrate ventral plate, its apical margin very slightly excised, its upper surface densely spinose. On each side at its base is a small, quadrate lobe.

♀ Unknown.

Length of fore wing, ♂, 6·5 mm.

Holotype ♂ (pinned, abdomen in glycerine), Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961 (*RLC*), BMNH.

Paratypes (pinned), same data, 5 ♂ (*RLC*) ; Sangu, c. 5,200 ft., mixed plants by deep cliff in river gorge, 22.xi.1961, 1 ♂ (*RLC*), BMNH.

In male genital structure, and in having only two ocelli, this species is closely related to *Uenoa burmana* (Mosely). It is distinctly smaller, the outer lobe of tenth tergite is more quadrate in side view, the inner lobes are excised apically, the parameres are less dilated and slightly clavate apically in side view and the ventral plate is narrower and less excised apically. The male maxillary palpus is single-segmented. Comparative figures of the aedeagus and claspers of *burmana* and *hiberna* are given.

Family **LEPIDOSTOMATIDAE**

Dinarthrella betteni Martynov

Taplejung Distr., Sangu, c. 6,200 ft., mixed vegetation by stream in gully, ix–x.1961, 1 ♂ (*RLC*).

Previous distribution. E. HIMALAYAS (Darjeeling distr.).

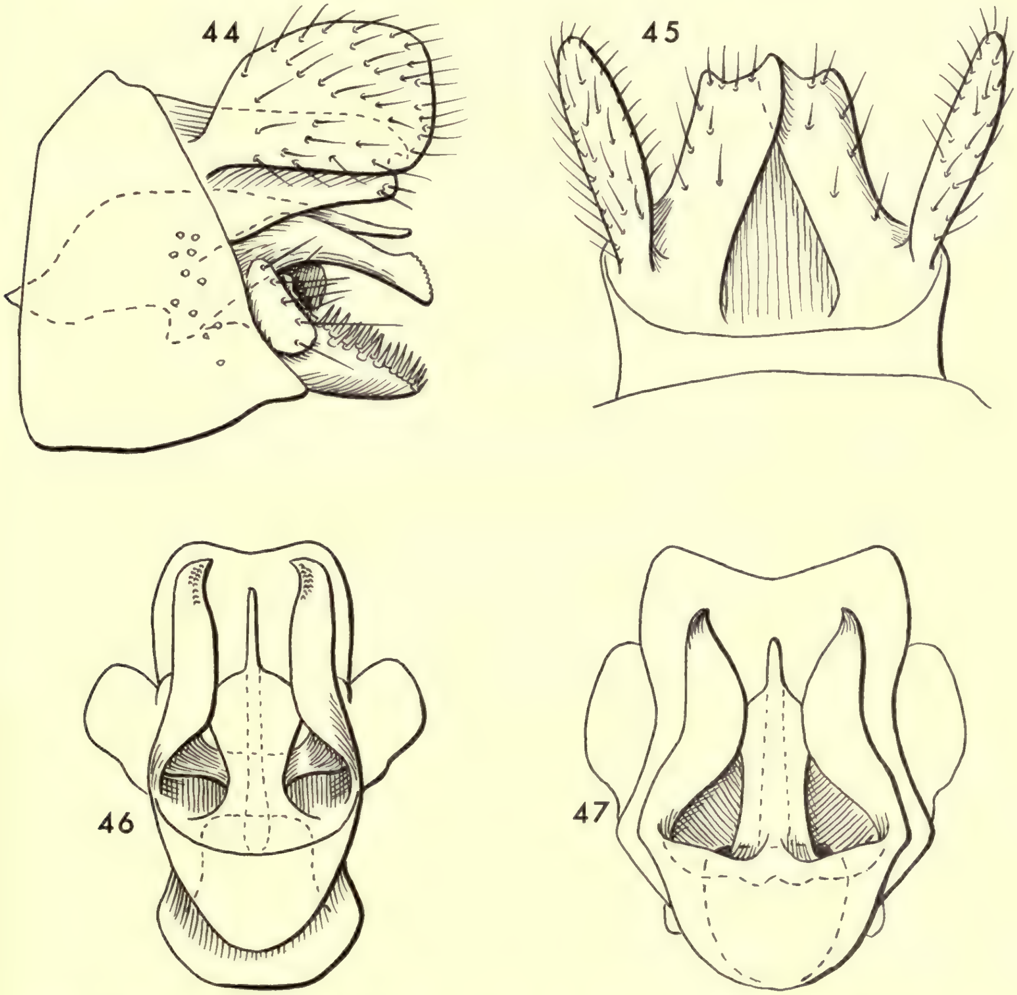
This specimen differs slightly from the figures given by Martynov. The basal segment of the antenna is relatively shorter and stouter and there are very slight differences in the tenth abdominal segment, but on such limited material these differences may be no more than individual variation.

Dinarthrum kamba Mosely, **var.**

Taplejung Distr., between Sangu and Tamrang, x–xi.1961, deep river gorge, c. 5,200 ft., 1 ♂ (*RLC*) ; river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961, 2 ♀ (*RLC*).

Previous distribution of *D. kamba* Mosely, N.E. BURMA.

The male genitalia are definitely of the pattern of *D. kamba*, but show slight differences and there are also slight variations in the basal segment of the antenna. In view of the considerable variation found by Schmid in his *D. iranicum*, these differences are considered only varietal. The two females are only provisionally associated with the male.



FIGS. 44–47. *Uenoa* spp. ♂ genitalia. 44–46, *U. hiberna* sp. n., 47, *U. burmana*. 44, lateral ; 45, dorsal ; 46, aedeagus and claspers, dorsal ; 47, the same.

Adinarthrum simplex sp. n.

(Text-figs. 48–51)

♂. General colour dark tawny. Basal segment of antenna about as long as distance between eyes, piceous, with a short, slender branch at base, directed upwards and inwards. Remaining segments tawny, annulated with fuscous. Legs tawny, spurs 2.4.4., one spur on anterior tibia very small. Wings rather denuded but with traces of fulvous pubescence and with whitish scale-like hairs persisting near the veins in both wings. In fore wing, anal fold about half as long as wing, not very conspicuous. Apical forks R_2 and R_4 definitely present and sessile. In the hind wing, apical fork R_2 is present and stalked, vein R_5 running into M_{1+2} and simulating a cross-vein, Cu_{1a} unforked.

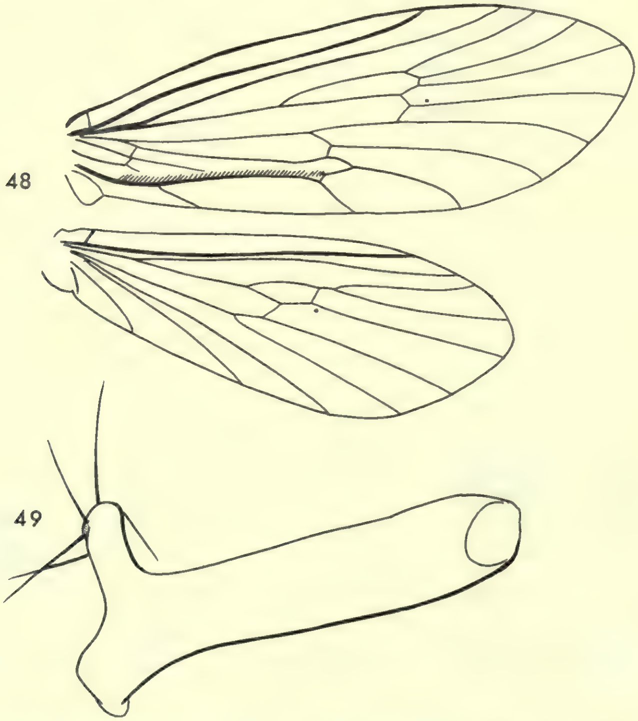
♂ Genitalia. Tenth tergite forming a broad hood, somewhat triangular in side view, produced in a pair of triangular lobes at its centre in dorsal view. The apical margin on each side is serrate. Aedeagus slender, downcurved, parameres reduced to a pair of short, blunt processes over the base of the aedeagus. Claspers apparently single-segmented, with a short basal process, directed upward and rather stouter than is usual in the genus. In side view, the clasper is fairly slender, about twice as long as tenth tergite. From above, the clasper is rather broader, incurving and dilating to a truncate apex.

♀ Unknown.

Length of fore wing, ♂, 5·5 mm.

Holotype ♂ (mounted as microscope preparations), Taplejung Distr., river banks below Tamrang Bridge, c. 5,500 ft., x–xi.1961 (*RLC*), BMNH.

Paratype (pinned) data as above, 1 ♂.

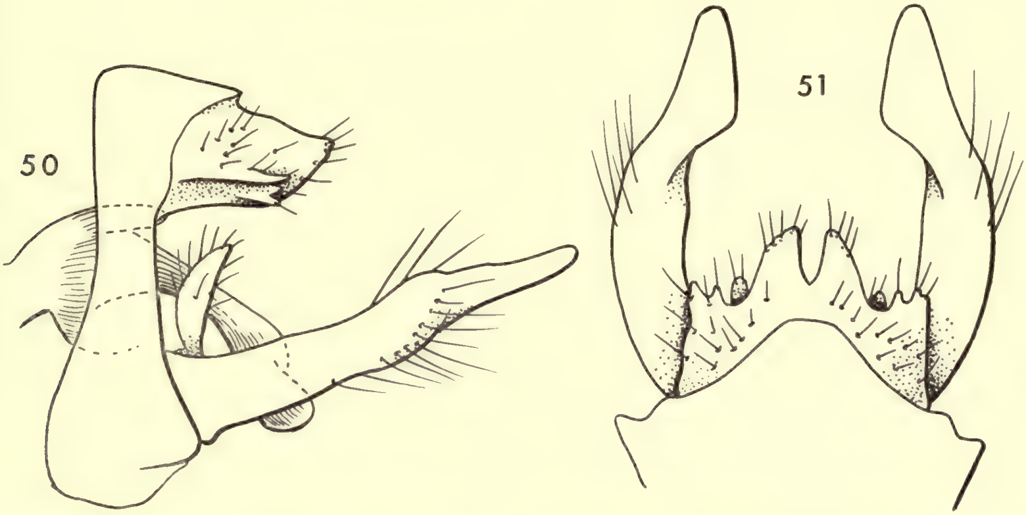


Figs. 48–49. *Adinarthrum simplex*, sp. n. ♂. 48, wings ; 49, basal segment of antenna.

This species has been placed in *Adinarthrum* on the general similarity of wings and genitalia, but it differs from the other species in the great reduction of the parameres, the stouter basal branch of the clasper and the apparently single-segmented clasper.

Lepidostomatidae ♀

Ulleri, 6–7,000 ft., 19.v.1954, 1 ♀ (*JQ*).



FIGS. 50–51. *Adinarthrum simplex* sp. n. ♂ Genitalia. 50, lateral ; 51, dorsal.

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NATURAL HISTO

NOTES ON THE EPITOLINAE

Part II

T. H. E. JACKSON

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 15 No. 3
LONDON: 1964

NOTES ON THE EPITOLINAE

Part II

BRITISH MUSEUM
22 JUL 1964
NATURAL HISTORY

BY

T. H. E. JACKSON
Kapretwa, Kitale, Kenya

Pp. 57–80 ; 8 *Plates* ; 5 *Text-figures*

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THE BULLETIN OF THE BRITISH MUSEUM (NATURAL HISTORY), *instituted in* 1949, *is issued in five series corresponding to the Departments of the Museum, and an Historical series.*

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THE BRITISH MUSEUM (NATURAL HISTORY)

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NOTES ON THE EPITOLINAE

Part II

By T. H. E. JACKSON

SYNOPSIS

The genus *Phytala* Westwood is revised and new species are described. Some new species of *Epitola* Westwood and a new genus are described, and notes are given on the genus *Epitolina* Aurivillius. The opportunity is taken to figure certain species of *Epitola* which have not been illustrated before. A new species of *Hewitsonia* Kirby is described.

PHYTALA Westwood

THE genus *Phytala* Westwood has not been revised since the publication of Aurivillius (in Seitz) (1920). A number of species were described subsequent to this and the descriptions are scattered in journals which are difficult to obtain ; further, several new species or subspecies have been discovered in recent years and these remain undescribed. It was felt, therefore, that it would be useful to revise the genus and bring all known species together in one publication. All species are figured and, where possible, the sexes are provisionally associated. All types are in the British Museum (Natural History) unless otherwise stated.

Phytala elais elais Westwood

♂ *Phytala elais* Westwood [1851]* : pl. 77, fig. 2.
Type. GHANA : Ashanti.
Phytala elais Westwood ; Westwood, [1852]* : 471.
♀ *Phytala elais* Westwood ; Holland, 1890 : 425.
Allotype. GABON : Kangwe (Carnegie Museum, Pittsburg).
♂, ♀ *Phytala elais* Westwood ; Aurivillius (in Seitz), 1920 : Pl. 64, *f*.

This species is too well known to require a detailed redescription. The upperside post-discal band in the female is pale yellow. No black markings in discal area of fore wing in the male.

Recorded from GHANA ; NIGERIA ; CAMEROONS ; GABON : Moyen Congo.

Phytala elais catori Baker

♂, ♀ *Phytala elais catori* Baker, 1903 : 328.
Types. SIERRA LEONE.
Phytala elais ab. *elaidina* Strand, 1920 : 148.

The upperside post-discal band in the female is pale blue and in the male there is a broad (3 mm. on vein 5) patch of the black ground colour from the upper end of the cell to vein 4 distally.

Recorded from SIERRA LEONE.

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* For date *vide* Hemming, 1941 : 452.

Phytala elais ugandae ssp. n.

(Pl. 1, figs. 1 and 2 ; Pl. 2, figs. 15 and 16)

This is the eastern subspecies.

♂. Differs from *elais elais* Westwood in the presence of a narrow black patch extending from the upper apex of the cell to vein 5 or just below on the upperside of the fore wing and from *elais catori* Baker in the narrower and more restricted area of this patch.

♀. Differs from both the other subspecies in that the post-discal patch on upperside of the fore wing is white.

Underside : as in the typical subspecies.

Holotype ♂. UGANDA : Bwamba Forest, Semliki Valley, xi. 1911 (*S. A. Neave*). Allotype ♀. Same data as holotype.

Recorded from CONGO : Upper Lindi River, Maiko, Bafwasendi, Lubuto R. ; SOUTHERN SUDAN : Tembura, Southern Bahr-el-Ghazal ; UGANDA : Bwamba, Katera.

The remaining smaller species of this genus may be divided into two groups.

Group 1. With a broad silvery white horizontal band on hindwing below, at least in the males.

Phytala vansomereni sp. n.

(Pl. 1, figs. 3, 4 ; Pl. 2, figs. 17, 18)

Nearest to *hyettoides* Aurivillius and *hyetta* Hewitson.

♂, ♀. Legs sepia brown with paler spots at the joints ; palps sepia above and below ; frons sepia ; eyes brown ; antennal shaft black above, checkered white below ; club with pale tips.

♂. *Upperside fore wing :* costal and inner margins narrowly black ; distal margin and apex broader black, 1 mm. on vein 1 and 3 mm. on vein 7 ; remainder of wing blue with a large black semi-triangular black patch distal to the cell, reaching the costal margin above the cell end and the distal margin narrowly at the apex of the triangle along vein 3 ; a square black spot in the base of space 1 and the cell ; veins blackened.

Upperside hind wing : margin narrowly black, costal margin including the whole of space 7 and the base of 6 black ; remainder of wing blue with a well-defined black stigma at the cell end ; veins blackened, especially vein 3.

Underside fore wing : sepia brown ; inner margin in space 1 silvery white to within 2 mm. of the distal margin ; a row of three silvery white small round spots, sub-marginal in 1, 2 and 3 ; a post-discal series of similar spots in 2–6 inclusive, that in 3 nearly obsolete.

Underside hind wing : sepia brown ; a broad silvery white horizontal band across the centre of the wing from costal to inner margin ; this band, as with other species of *Phytala*, varies in width, but is usually about 3 mm. broad.

♀. *Upperside :* warm brown, unmarked except for a series of five obscure post-discal spots in fore wing in 1 and 2 and 4–6, those in 5 and 6 being bluish white.

Underside fore wing : dark sepia ; a complete series of obscure submarginal whitish spots ; inner margin silvery white in space 1, but basally not reaching further than vein 1b ; small silvery white spots in 2 and 4–6, postdiscal.

Underside hind wing : sepia brown ; an obscure narrow horizontal whitish band across wing from costa to inner margin, placed distally of the cell and much overlaid with brown scales ; faint traces of linear dark marginal and submarginal lines.

Length of fore wing : ♂ 19 mm. ; ♀ 18 mm.

Holotype ♂. UGANDA : Masaka, Sango Bay, Katera, vii. 1960 (*T. H. E. Jackson*).
Allotype ♀. UGANDA : Entebbe, vi. 1954 (*T. H. E. Jackson*).

Recorded from CONGO : Beni, Lake Tumba ; UGANDA : Katera, Entebbe, Kampala, Mabira.

Named in honour of Dr. V. G. L. van Someren of Nairobi, Kenya, whose work on the Rhopalocera of East Africa is well known.

Phytala hyettoides Aurivillius

(Pl. 1, figs. 7, 8 ; Pl. 2, figs. 21, 22)

♂ *Phytala hyettoides* Aurivillius, 1895 : 206.
Type. CAMEROONS. (Mus. Holmiae).

Nearest to *vansomereni* sp. n., from which it differs in the restricted black area in the cell and beyond in fore wing above and in the broader white band in hind wing underside. The spot in 3 of forewing underside larger.

♀. *Upperside :* warm brown, very similar to *vansomereni* ; immaculate except for small whitish post-discal spots in 2, 4, 5 and 6 ; space 1 paler in centre.

Underside fore wing : darker brown with the following markings ; a full series of quite prominent submarginal pale spots ; whitish post-discal spots in 2, 4, 5 and 6, with a minute spot in 3 ; the lower half of 1 whitish.

Underside hind wing : paler brown ; faint pale marginal and submarginal lines ; faint paler shading across the centre of the wing replaces the white band in the male.

Length of fore wing : ♂ 17 mm. ; ♀ 16 mm.

Neallotype ♀. SIERRA LEONE : Kholifa, xii.1903, D. Cator Coll., B.M. (N.H.).

Recorded from IVORY COAST ; GHANA : Cape Coast Castle ; NIGERIA : Eket, Warri, Ubiaja, Ikom ; CAMEROONS ; FERNANDO PO.

Phytala hyetta Hewitson

(Pl. 1, fig. 5 ; Pl. 2, fig. 19)

♂ ***Epitola hyetta*** Hewitson, 1873 : 150.
Type. ANGOLA.
♂ ***Epitola hyetta*** Hewitson ; Hewitson 1878 : 19, pl. 1b, figs. 11 and 12
♂ ***Epitola hyetta*** Hewitson ; Aurivillius (in Seitz), 1920 : pl. 65, *d*.

Nearest to *vansomereni* sp. n. and the latter may be a subspecies of *hyetta* ; differs in the smaller and narrower fore wing post-discal blue spots in 4, 5 and 6.

Recorded from ANGOLA ; CONGO : Kimuenza (after Aurivillius 1923 : 1196).

Phytala hyettina Aurivillius

(Pl. 1, figs. 9, 10 ; Pl. 2, figs. 23, 24)

♂ ***Phytala hyettina*** Aurivillius, 1897 : 214.
Type : SIERRA LEONE. (Coll. Staudinger, Berlin.)
♂ ***Phytala hyettina*** Aurivillius, 1897 ; Aurivillius, 1898 : 289, fig. 33.
♂ ***Phytala hyettina*** Aurivillius ; Aurivillius (in Seitz), 1920 : pl. 65, *d*.

Nearest to *intermixta* Aurivillius and *hyetta* Hewitson, but distinguished from both by the broad (2 mm.) black border on hind wing above and from *intermixta* by the blue post-discal spot in 3 of fore wing being larger than those in 4, 5 and 6.

♀. *Upperside* : plain brown, immaculate.

Underside fore wing : brown ; a complete row of small pale, submarginal spots ; similar post-discal spots in 1 and 2, 5 and 6, inner margin narrowly whitish.

Underside hind wing : brown ; a complete series of pale submarginal spots ; a narrow (1 mm.) palish band horizontally across wing from apex to centre of inner margin.

Length of fore wing : 17 mm.

Neallotype ♀. SIERRA LEONE : Moyamba, vi.1902, D. Cator Coll., B.M. (N.H.).

Recorded from SIERRA LEONE ; IVORY COAST ; GHANA.

Phytala intermixta Aurivillius

(Pl. 1, figs. 11, 12 ; Pl. 2, figs. 25, 26)

♂ *Phytala intermixta* Aurivillius, 1897 : 215.
Type : GABON. (Coll. Staudinger, Berlin.)
Phytala intermixta Aurivillius ; Aurivillius, 1898 : 289, fig. 34.

The type of this species, ex Berlin, has been examined. This species is close to *hyettina* Aurivillius, but the post-discal blue spot in 3 of the fore wing is smaller than those in 4, 5 and 6 ; the hind wing band is narrow, only 1 mm. broad, and the veins of hind wing, especially vein 4, are more heavily blackened.

The female differs considerably from that of *hyettina* Aurivillius.

♀. *Upperside* : sepia brown ; small white post-discal spots in 4, 5 and 6 fore wing, occasionally also in 1 and 2 ; no other markings.

Underside fore wing : dark sepia ; white post-discal spots in 2, 4, 5 and 6 and inner margin white, covering most of space 1 ; white submarginal spots in 1, 2 and 3, then a double line across apex.

Underside hind wing : dark brown ; an obscure horizontal narrow band across wing from apex to mid-inner margin ; two faint crenulate lines marginal and submarginal.

Length of fore wing : 16 mm.

Neallotype ♀. RÉPUBLIQUE DU CONGO : Moyen Congo, Etoumbi, x.1960 (*T. H. E. Jackson*).

Recorded from SIERRA LEONE : Moyamba ; CAMEROONS : Bitje ; RÉPUBLIQUE DU CONGO : Sembe, Etoumbi ; GABON.

***Phytala aequatorialis* sp. n.**

(Pl. 1, figs. 13, 14 ; Pl. 2, figs. 27, 28)

A small species belonging to the group with white band on hind wing below, but not very near any of the others.

♂, ♀. Legs dark sepia brown, only very slightly paler at the joints ; frons and palps sepia ; eyes brown ; antennal shaft black above, checkered white below ; club tipped yellow.

♂. *Upperside fore wing* : costal and inner margins very narrowly black ; distal margin and apex broadly black, 2 mm. on vein 1 and 5 mm. on vein 6 ; cell and bases of spaces 4, 5 and 6 black, joining the marginal border along the lower half of space 4 ; two blue streaks in the base of the cell and another along the upper discocellular ; spaces 1, 2 and 3 blue to within 2 mm. of the margin ; blue spots in 5, 6 and 8, with a gap in space 4.

Upperside hind wing : distal border very narrowly black ; costal border black to space 7 and half 6 ; remainder of wing blue with black veins especially vein 4.

Underside fore wing : greyish brown ; traces of small pale submarginal spots ; inner margin pale grey and pale grey post-discal spots in 2, 3, 4 and 5, that in 3 being minute.

Underside hind wing : greyish brown ; a silvery white horizontal band across the wing from above the apex to mid-inner margin, 2 mm. wide ; marginal and submarginal markings scarcely apparent.

♀. *Upperside :* brown ; traces of two bluish spots in 5 and 6, otherwise unmarked.

Underside fore wing : a series of fairly prominent palish submarginal spots and pale post-discal spots in 2, 4, 5 and 6 ; inner margin also pale.

Underside hind wing : grey brown ; a darker post-discal area ; a series of paler submarginal and marginal crenulate spots and some obscure markings in the base.

Length of fore wing : ♂, ♀, 15 mm.

Holotype ♂. NIGERIA : Lagos Dist., Oshodi, iv.1955 (*T. H. E. Jackson*).

Allotype ♀. Same data as holotype.

Only the types are known.

Group 2. Without a silvery white horizontal band on hind wing below in either sex.

Phytala henleyi Kirby

(Pl. 3, figs. 29, 30 ; Pl. 4, figs. 47, 48)

♂ *Phytala henleyi* Kirby, 1890 : 272.
Type. Cameroons : Barombi. (Coll. Staudinger, Berlin.)
♂ *Phytala henleyi* Kirby ; Grose-Smith & Kirby, 1892 : Afr. Lyc., pl. 17, figs. 3, 4.
♂ *Phytala henleyi* Kirby ; Aurivillius in Seitz, 1920 : pl. 64, *d*.
♀ *Phytala henleyi* Kirby ; Aurivillius 1923 : 1196.

The type of this species has been examined.

Nearest to *schultzei* Aurivillius and *reducta* Aurivillius but differs from both in the larger black area post-discal fore wing and the heavily blackened vein 3 hind wing. The blue post-discal spots are shorter than in *schultzei*. Length of fore wing : 14–15 mm.

Recorded from GHANA : Akyem, Boutibor ; LIBERIA : Kpaine ; NIGERIA : Oshodi, Udi, Ubiaja, Mamu, Awka ; CAMEROONS : Bitje ; RÉPUBLIQUE DU CONGO : Etoumbi.

Phytala schultzei Aurivillius

(Pl. 3, figs. 31, 32 ; Pl. 4, figs. 49, 50)

♂, ♀ *Phytala schultzei* Aurivillius, 1923 : 1196, pl. 50, fig. 1.
Type. S. CAMEROONS : Yukaduma. (Mus. Hamburg, destroyed.)

Closely allied to *henleyi* Kirby, but differs in the restricted black post-discal patch fore wing ; the more extensive blue post-discal series and in the less prominent blackening of vein 3 hind wing.

A translation of the original description is given below.

♂. *Upperside fore wing :* black with nearly free blue spots in 1b–6–11 and in the cell ; the spot in 1b is large, covering the base of the cellule, but a little shorter than the spot in cellule 2 ; near the cell there are two small black spots ; in the basal angle the cell is dusted with blue scales ; two blue spots in the lower half of cell and one close to the end of the cell in 4 (or in 4 and 5) ; the upper half of cell and cellules 1a and 12 entirely black ; apex and distal margin broadly black.

Upperside hind wing : brilliant blue with a fine black marginal line ; cellules 1a and 1b greyish black ; cellules 7 and 8 and the base of 6 black.

The underside is near that of *Phytala henleyi*, but it is lighter, more grey and in consequence one can see in the fore wings two light grey spots in the cell and one in the base of cellule 4. Vein 1 of the fore wing is straight as far as the base, but thickened at its point of origin, outlining a mealy spot, very narrow and indistinct. *Phytala schultzei* agrees almost exactly with *Phytala hyetta* in the blue markings above. It is distinguished by the underside which is entirely different ; by the much wider marginal border upperside fore wing and by vein 1 of the fore wing being straight at the base.

♀ (?). As a doubtful female of this species, I choose an example taken at the same locality (Yukaduma) and at nearly the same time as the male. Above it is entirely greyish black without markings. Below in the fore wing it has the same light grey spots as in the male, but they are smaller and less distinct ; the underside hind wing, on the contrary, is centrally brown and not grey as in the male.

Expanse ♂ 29/30 mm.: ♀ 28 mm.

2 ♂♂, 1 ♀ (?).

Süd Kamerun : Yukaduma 5/8.iii.11, 10/17.iv.11 ; ♀ (?) 24/28.ii.11.

The above female was probably *henleyi* Kirby with less well developed blue spots in the fore wing. The correct female is described below.

♀. Eyes brown ; palps dark grey ; legs dark blackish brown ; slightly paler at the joints ; frons greyish brown ; antennae black above, checkered white below ; club orange-tipped.

Upperside fore wing : dark sepia brown with a series of large dark blue, post-discal spots in 1, 2, 4, 5, 6 and 7 and a small blue spot at the end of the cell.

Upperside hind wing : dark sepia brown, immaculate.

Underside fore wing : ground colour, warm brown ; whitish crenulate submarginal line, becoming double from vein 2 to the apex ; post-discal white spots in 1, 2, 4, 5 and 6 ; inner margin narrowly white, thus differing from the male in which the whole of space 1 is white.

Underside hind wing : warm brown ; four lighter crenulate lines, two submarginal and two post-discal ; the fourth of this series passes over the end of the cell and is here double with a dark central streak ; this character is also present in the male although more obscure ; some paler scaling along the inner margin.

Length of fore wing : 17 mm.

The types of this species were destroyed in the Hamburg Museum in 1943 and this has been confirmed by the Director.

The series before me agrees with the original description and there are several examples from Bitje, Cameroons, which is near the type locality. I propose, therefore, to designate a neotype male.

Neotype ♂. RÉPUBLIQUE DU CONGO : Ouesso, Ketta Forest, ix.1959 (*T. H. E. Jackson*).

Neallotype ♀. RÉPUBLIQUE DU CONGO : Moyen Congo, Mambili Forest, iv.1962 (*T. H. E. Jackson*).

Recorded from S. CAMEROONS ; NIGERIA ; RÉPUBLIQUE DU CONGO ; GABON ; CONGO.

Phytala reducta Aurivillius

(Pl. 3, figs. 33, 34 ; Pl. 4, figs. 51, 52)

♂ *Phytala reducta* Aurivillius, 1923 : 1197.

Type. S. CAMEROONS : Malen. (Mus. Hamburg : destroyed.)

Allied to *henleyi* Kirby and *schultzei* Aurivillius but black markings fore wing reduced to a small costal triangular patch, and small spots in cell and in space 1 ; fore wings narrow and apex sharply pointed. A translation of the original description of the male is given below.

♂. Abdomen, palps and legs sepia brown ; frons without lateral pale bands ; antennae black, checkered indistinctly with yellow ; club yellow tipped. Wings above bright dark blue. Fore wings with straight black costal border to apex and distal border (the latter is broken in this specimen and it is not possible to describe exactly the extent of the blue area). As in *Phytala hyettoides*, the blue colour reaches the base of 2 and 3 ; it is only interrupted by two small black spots in the base of 1b, 3 or 4 similar spots in the cell and a streak across the apex of the cell ; small oval, mealy spot at base of vein 1. Hindwings ; blue from 1b–5 (as far as the marginal border?) and in the lower half of 6.

Underside dark brown in both wings, almost exactly of the colour and markings of *Phytala henleyi*.

Expanse 27 mm.

1 ♂.

Süd Kamerun : Malen. 18/21.v.11.

♀. *Upperside :* fore wing narrow and apex sharply pointed ; dark sepia brown with small bluish spots, post-discal in 2, 4, 5 and 6 ; no other markings.

Underside fore wing : as in *henleyi* and *schultzei*, but all markings very obscure—a faint trace of a post-discal spot in 3.

Underside hind wing : markings as in the species mentioned above, but all very obscure.

Length of fore wing : 15 mm.

The same remarks apply here as in *schultzei* Aurivillius. There is a male before me from Bitje, Cameroons and the description tallies. A neotype ♂, to replace the original, known to have been destroyed, is therefore designated.

Neotype ♂. RÉPUBLIQUE DU CONGO : Ouesso, Mambili Forest, vi.1960 (*T. H. E. Jackson*).

Neallotype ♀. Same data as neotype.

Recorded from S. CAMEROONS : Malen ; CAMEROONS : Bitje ; RÉPUBLIQUE DU CONGO : Ouesso, Mambili, Ketta.

***Phytala pulchra* sp. n.**

(Pl. 3, figs. 35, 36 ; Pl. 4, figs. 53, 54)

From the underside colour and markings nearest to *benitensis* Holland, but with normally shaped wings.

♂, ♀. Eyes brown ; legs sepia with prominent paler spots at the joints ; palps sepia with much grey scaling below ; frons sepia ; antennae black above, checkered white below ; club yellow tipped.

♂. *Upperside fore wing :* black ; costal distal and inner margins broadly black ; brilliant blue spots as follows : post-discal in 2, large, quadrate, others smaller in 4, 5 and 6 and a streak in 7 ; three spots in line in the cell and a streak in the base ; a small spot in base of 1 followed centrally by a long narrow spot in the upper half of the cellule.

Upperside hind wing : brilliant blue with black veins ; vein 3 heavily blackened and a heavy black stigma across the end of the cell ; margin black, about 1 mm. on vein 5, then tapering to the anal angle ; costa black to vein 6 ; spaces 1a and 1b covered in long hair.

Underside fore wing : ground colour greyish brown ; faint crenulate lines across apex, marginal and submarginal, ending on vein 3 ; discal area and beyond darker, blackish ; small pale post-discal spots in 2, 4 and 5 ; inner margin slightly paler.

Underside hind wing : greyish brown, irrorated with silvery grey scales and with faint silvery, crenulate marginal and submarginal lines ; obscure silvery spots in the discal area.

♀. *Upperside :* dark sepia brown ; some blue scales in space 1 fore wing and blue post-discal spots in 2, 4, 5 and 6, those in 4 being the smallest ; no other markings.

Underside : as in the male but the marginal and submarginal crenulate lines reach vein 1 and the inner margin is silvery white in fore wing ; ground colour paler, warmer brown.

Length of fore wing : ♂ and ♀ : 15 mm.

Holotype ♂. RÉPUBLIQUE DU CONGO : Ouesso, Ketta Forest, xii.1959 (*T. H. E. Jackson*).

Allotype ♀. Same data as holotype.

Known only from the types which were taken *in cop*.

Phytala benitensis Holland

(Pl. 3, figs. 37, 38 ; Pl. 4, figs. 55, 56)

♂ *Epitola benitensis* Holland, 1890 : 425.
Type. GABON : Ogove River. (Carnegie Mus. Pittsburgh.)
Phytala benitensis (Holland) ; Jackson, 1962 : 155.

Distinguished from all other species in the genus by the peculiar angled fore wings. Underside nearest to *pulchra* sp. n. and *rezia* Kirby ; see under the latter for further remarks.

♀. *Upperside :* dark brown with blue post-discal spots in 1, 2, 4, 5 and 6 ; no other markings; fore wing angled on vein 3, as in the male.

Underside fore wing : warm dark brown ; a series of paler crenulate, submarginal spots from inner margin to costa ; small marginal spots from vein 2 to costa ; pale post-discal series from 2 to 6 inclusive, that in 3 being smallest ; lower half of space 1 whitish.

Underside hind wing : dark brown ; a series of paler crescentric marginal spots, a larger similar series submarginal ; some obscure pale discal spots from costa to inner margin.

Length of fore wing : 15 mm.

Neallotype ♀. CAMEROONS : Bitje, 1913 (Joicey Bequest).

Recorded from NIGERIA : Oban, Ubiaja ; CAMEROONS : Bitje ; RÉPUBLIQUE DU CONGO : Ouesso, Mambili.

Phytala obscura Schultze

♂ *Phytala obscura* Schultze, 1916 : 142.
Type. S. FERNANDO PO : San Carlos. (Mus. Hamburg : destroyed.)

A translation of the original description is as follows :—

In this dark species the blue colour consists of some sparse dark blue-violet scales in spaces 1b and 2, only, in fore wing and in the hind wing, of about the same extent as in *Phytala hyettina* Aurivillius. The colour below is sombre without sheen. The hind wings entirely without markings. The greater part of the fore wings are blackish grey without precise margins, becoming darker towards the costa ; this patch occupies the area between veins 6 and 2. A small pale spot in this patch between spaces 4 and 5.

Expanse 30 mm.

I took a single example in the cocoa plantations near San Carlos (S. Fernando Po). *Phytala obscura* is another example of the tendency to melanism in the butterflies of this island.

There are no specimens of this species in any collection known to the author. It is probably confined to Fernando Po.

Phytala rezia Grose-Smith & Kirby **(comb. n.)**

(Pl. 3, fig. 40 ; Pl. 4, fig. 58)

♂ *Epitola rezia* Grose-Smith & Kirby, 1893 : 86.
Type. GABON. (Coll. Staudinger, Berlin.)
[♀] = ♂ *Epitola rezia* Grose-Smith & Kirby, 1893 : 87, pl. 20, fig. 6.
Allotype [♀] = ♂. CAMEROONS. (Coll. Staudinger, Berlin).

The type "♀" of this species, which is a male, has been examined by courtesy of the Humboldt Universität, Berlin. The type male mentioned by Grose-Smith & Kirby is apparently missing. The specimen of *rezia* above shows an evenly curved distal margin to the fore wing, whereas in 4 specimens of *benitensis* Holland, before me, 2 ♂ 2 ♀, the distal margin is distinctly angled at vein 3. The markings, however, both above and below, are identical. On the shape of the distal margin of fore wing of *benitensis* and due to the paucity of material of *rezia* it is felt safer to use the two names with the proviso that they are possibly conspecific. It is significant that at the end of the original description Grose-Smith & Kirby state :—"We believe that Dr. Holland considers the specimen figured to be his *Epitola benitensis* (Psyche, vol. V, p. 425), but the anterior wings of our species do not exhibit the peculiar 'falcate' form which he describes". These two "species" differ from all others in the presence in the fore wing upperside of a complete postdiscal series of small, rounded blue spots. There are no examples of *rezia* Kirby in the British Museum (Nat. Hist.).

♀. Unknown.

Recorded from CAMEROONS ; GABON.

Phytala nigrescens **sp. n.**

(Pl. 3, fig. 39 ; Pl. 4, fig. 57)

♂. Eyes brown ; palps and frons sepia ; legs sepia, very little paler at the joints ; antennae black above checkered white below ; club minutely orange tipped.

Upperside fore wing : black ; small, dark blue-purple spots, postdiscal, in 1, about centre, in 2, 4, 5 and 6 and a very minute spot in 3.

Upperside hind wing : black with some scattered blue scaling in the base ; no other marks.

Underside fore wing : dark sepia ; the whole of space 1 pale grey ; grey spots postdiscally in 2–6, inclusive and a full series of quadrate grey submarginal spots.

Underside hind wing : entirely unmarked.

Length of fore wing : 14 mm.

Holotype ♂. NIGERIA : Onitsha Prov., Mamu, Awka, ii.1960 (*T. H. E. Jackson*).

This species is known from only a single male, but differs so much from all other known species that it deserves a name. The small size and immaculate hind wing below is like *obscura* Schultze, but the upperside is entirely different ; the almost complete absence of blue on the hind wing above is unique.

EPITOLA Westwood

Further collecting since the publication of the latest revision of the genus *Epitola* Westwood (Jackson, 1962), and a close examination of the types, have revealed the fact that the two species *Epitola albomaculata* Baker and *Epitola gerina* Hewitson consist of a complex of closely allied but completely distinct species and these are now separated or described below.

The opportunity is also taken to include certain addenda and corrigenda to the above paper.

The subgroup with white undersides centred around *Epitola gerina* Hewitson consists of four distinct species, easily separated, apart from colour and pattern, by the secondary sexual characters of the males, i.e. the swollen and blackened veins in the base of the fore wings, which are completely different in each species. The synonomy, given in Jackson, 1962 and also the records are corrected below.

Epitola gerina Hewitson

(Pl. 5, figs. 70, 71 ; Pl. 6, figs. 83, 84)

♂ *Epitola gerina* Hewitson, 1878 : 19, pl. 1b, figs. 13, 14.
Type. CONGO.
♂ *Epitola gerina* Hewitson ; Aurivillius (in Seitz), 1920 : pl. 65, *b*.

The type of this species is very old and worn, but retains sufficient characters on the underside to enable it to be placed. The figures listed in the synonymy are inaccurate, due to the state of the specimen. The fore wings are blue as far as the base and the underside hind wing has small blackish streaks and lines both basally, discally and postdiscally. Vein 1 for 6 mm. from the base and the lower discocellular, swollen and blackened. Distal edge of blue spots fore wing, convex and deeply incised. Fore wing less sharply pointed.

Underside markings dark grey ; fore wing inner margin black in the whole of space 1 ; fore wing submarginal and postdiscal lines much as in *nitide* Druce, but in hind wing the streaks beyond the postdiscal series are separate and placed at an angle to each other ; lines present in basal, discal, postdiscal, submarginal and marginal areas ; length of fore wing 18 mm.

Since it is now considered that *goodi* Holland and *zelica* Kirby are good species, the female of *gerina* Hewitson has not been described.

♀. *Upperside fore wing :* ground colour black ; blue discal area from base to within 2 mm. of the margin in 1, 3 mm. in 2, only the base of 3, the whole of the cell and a prolongation along vein 4.

Upperside hind wing : black ; blue area restricted to below vein 6, covering cell and just beyond, leaving a broad black distal margin of 5 mm.; females from the east, i.e. Uganda, Bwamba, tend to have more extended blue and a narrower black border on the hind wing.

Underside : as in the male.

Length of fore wing : 17 mm.

Neallotype ♀. RÉPUBLIQUE DU CONGO : Moyen Congo, Etoumbi, x.1960 (*T. H. E. Jackson*).

Recorded from CONGO ; RÉPUBLIQUE DU CONGO : Etoumbi ; UGANDA : Bwamba, Katera, Mukono.

Epitola zelica Kirby

(Pl. 5, figs. 68, 69 ; Pl. 6, figs. 81, 82)

♂ and [♀] = ♂ *Epitola zelica* Kirby, 1890 : 272.
Types. CAMEROONS : Barombi. (In Humboldt Universität, Berlin.)
[♀] = ♂ *Epitola zelica* Kirby ; Grose-Smith & Kirby, iv.1892 : Afr. Lyc. pl. 13, figs. 5, 6.
♀ *Epitola subalba* Baker, 1915 : 190.
Type. CAMEROONS : Bitje.

Through the courtesy of Dr. H. J. Hannemann of the Humboldt Universität, Berlin, the types of this species have been examined and both are males. The swollen and blackened vein 1 of the fore wing, a secondary sexual character of the male, is indicated in Grose-Smith & Kirby's figure of the " female ". An examination of a very clear photo of the type of *subalba* Baker, which is in good condition, shows it to be without doubt a female of *zelica* Kirby, and this therefore is selected as the neallotype ♀. The photo shows on the underside only crenulate submarginal lines with faint traces of a postdiscal on fore wing and no basal markings whatever and *zelica* is the only species of the subgroup with these characters.

Differs from the other species of this subgroup as follows :—

♂. Vein 1 and the lower discocellular swollen and blackened, the former for 9 mm., i.e. over half its length, the latter throughout, including the bifurcation of veins 2 and 3.

Upperside : colour pale silvery blue, there is no white as indicated in Grose-Smith & Kirby's figure ; distal edge of blue area of fore wing not so deeply indented as in *gerina* Hewitson.

Underside : faint crenulate submarginal and antemarginal lines in both wings, otherwise plain white, with no basal marks.

♀. *Upperside :* very similar to *gerina* Hewitson above, but blue paler.

Underside : markings similar to the male but a little more prominent, especially the submarginal lines ; fringes brown ; whole basal and discal areas pure white.

Length of fore wing : ♂ 19 mm., ♀ 17 mm.

Recorded from CAMEROONS : Bitje, Barombi ; UGANDA : Bwamba.

Epitola goodii Holland **sp. rev.**

(Pl. 5, figs. 72, 73 ; Pl. 6, figs. 85, 86)

♀ *Epitola goodii* Holland, 1890 : 24.
Type. GABON : Ogove.
♀ *Epitola goodii* Holland ; Grose-Smith & Kirby, iv.1892 : *Afr. Lyc.* pl. 17, figs. 7, 8.

Distinguished from the other members of this subgroup by the more rounded fore wings and paler less brilliant blue in the male.

♂. *Upperside fore wing :* vein 1 not swollen or blackened ; discocellular blackened, finely, throughout, including a small bifurcation at the cell end ; distal edge of blue area as in the females, i.e. a large indentation basad in 3, with a small free blue spot distad ; a rounded spot in 4, forming a prolongation of the discal patch.

Upperside hind wing : entirely blue to vein 6, then black to costa ; a very fine black border and white fringes.

Underside : agrees very well with the figure of the female in Grose-Smith & Kirby ; all markings are pale yellow.

Length of fore wing : 17 mm.

Neallotype ♂. UGANDA : Budongo, viii–ix.1934 (*T. H. E. Jackson*).

Recorded from GABON : Ogove ; UGANDA : Unyoro, Budongo and Bugoma.

Epitola nitide Druce

(Pl. 5, figs. 74, 75 ; Pl. 6, figs. 87, 88)

♂ *Epitola nitide* Druce, 1910 : 336, pl. 34, fig. 1.
Type. CAMEROONS : Bitje, Ja River.
♂ *Epitola nitida* [*sic*] Druce ; Aurivillius (in Seitz), 1920 : 356.

Differs from the other species of the subgroup as follows :—

♂. Vein 1 and the lower discocellular swollen and blackened, the former for 8 mm., the latter throughout its length, including the bifurcation of veins 2 and 3. Distal edge of blue area fore wing concave. Fore wings sharply pointed.

♀. *Upperside fore wing :* black, with dark blue basal and discal area, confined by the upper discocellular and reaching the inner margin ; distal edge deeply excised in the upper half of space 2 and in 3 and prolonged ending in a white spot in 4.

Upperside hind wing : costal margin black to vein 6 ; blue basal and discal area very irregularly indented distally, but reaching in rays to 2 mm. of the margin.

Underside : exactly as in the male, i.e. white with broad yellowish submarginal, antemarginal and postdiscal lines and small yellowish basal spots.

Length of fore wing : ♂ 21 mm., ♀ 22 mm.

Since *subalba* Baker is a synonym of *zelica* Kirby, the female of *nitide* Druce has not previously been described.

Neallotype ♀. RÉPUBLIQUE DU CONGO : Moyen Congo, Kelle, vii.1962 (*T. H. E. Jackson*).

Recorded from CAMEROONS : Bitje ; RÉPUBLIQUE DU CONGO : Kelle.

Note : The left hind wing of the type male has been mended by insertion of a piece of wing from an *Argiolaus* ! The markings, therefore, in this area below, i.e. small black submarginal streaks and the remains of a red and black anal spot, should be ignored.

A study of new material collected since the publication of the latest revision (Jackson, 1962), shows that there are at least seven species in the subgroup centred around *albomaculata* Baker ; i.e. *albomaculata* Baker, *liana* Roche, *daveyi* Roche, *virginea* Baker, and three new species which are described below. It is possible that one of the new species is *lamborni* Baker, but the type female, which is unique, is missing. All three are nearest to *albomaculata* Baker, but the latter differs in both sexes from all the others by the blue discal area fore wing being confined below vein 5 and by the underside being merely white with light brown markings all of the same tone.

***Epitola dubia* sp. n.**

(Pl. 3, figs. 43, 44 ; Pl. 4, figs. 61, 62)

♂, ♀. Eyes dark brown ; legs black, but almost entirely overlaid with white scales ; palps white below, dark brown above ; frons dark brown ; antennae black, checkered white below ; club yellow-tipped.

♂. *Upperside fore wing :* black with large, brilliant blue discal patch extending from base to within ½ mm. of the margin in 1, 1 mm. in 2, and 2 mm. in 3 ; thus evenly curved to vein 4 ; a projection distally in 4 and 5, then receding proximally to vein 7 ; costal border black to vein 7 and apex broadly black ; vein 1 and the lower discocellular broadly swollen and blackened.

Upperside hind wing : blue from vein 1 to vein 6 ; very narrow black margin ; costal margin black to vein 6.

Underside fore wing : creamy white with dark grey markings ; two sagittate marginal and submarginal lines much bolder than in *albomaculata* Baker ; a sagittate postdiscal line again much bolder than in *albomaculata* ; these lines black between veins 1–3 ; the white space between the submarginal and postdiscal lines broad ; in *albomaculata* in both wings these white areas consist merely of rounded spots ; three irregular white-centred markings in the cell ; space 1 black from base to centre.

Underside hind wing : creamy white ; markings dark grey ; basal, discal and two postdiscal lines, more or less divided into spots, with paler centres ; sagittate marginal and submarginal lines and a darker quadrate area proximal of the apex ; pale area between submarginal and postdiscal lines broad and uninterrupted.

♀. *Upperside fore wing :* black ; base, cell and space 1 to within 2 mm. of the margin violet blue ; a white spot at end of cell and another elongate oval, just beyond it ; a white spot midway in 2 and space 2 blue in the base.

Upperside hind wing : blackish brown, not very heavily scaled ; cell and proximad in the bases of 1, 2 and 3 violet blue ; costal margin to vein 6 whitish.

Underside : as in the male, but all markings paler.

The cilia in this species are not checkered in either wing.

Length of fore wing : ♂ 19 mm., ♀ 18 mm.

Holotype ♂. UGANDA : Bwamba, Mongiro, xi.1961 (*T. H. E. Jackson*).

Allotype ♀. Same data as holotype, i.1962.

Recorded from RÉPUBLIQUE DU CONGO : Etoumbi ; UGANDA : Bwamba.

Epitola cyanea **sp. n.**

(Pl. 3, figs. 45, 46 ; Pl. 4, figs. 63, 64)

♂, ♀. Eyes brown ; legs brown, heavily scaled white ; palps also brown with much white scaling below, brown above ; frons brown ; antennal shaft black above, checkered white below ; club yellow tipped ; cilia of hind wing upperside checkered white, thus resembling *liana* Roche, in which the cilia is checkered in both wings.

♂. *Upperside fore wing :* blue area of roughly the same extent as in *dubia* sp. n.; no prolongation in 4 and 5 and distal edge evenly rounded but sagittate in the interspaces ; vein 1 at the base and the lower discocellular not so broadly swollen and not so black ; blue brighter.

Upperside hind wing : as in *dubia* ; blue to vein 6 ; broad black costal border and narrow black distal border.

Underside : similar in general to *dubia* ; but differs as follows : white bands in both wings distal of the postdiscal lines much broader ; space 1 in fore wing not black in base ; instead a black bar in centre and black spots in the base of 2–3 ; whole fore wing distad of the white band darkened and thus contrasting with the remainder of the wing ; square black spot on hind wing apex darker ; basal and discal spots of hind wing fewer and more scattered ; marginal series of hind wing merely small dark grey crescents ; ground colour white not cream.

♀. Nearest to *dubia*, but differing in the white spot in space 4 fore wing, which is narrow and streak-like uninterrupted by black, except for a fine black line at the end of the cell and on the underside which is as in the male.

Upperside fore wing : black with large blue basal patch extending in streaks beyond the cell in 3, 4, 5 and 6 and to within 3 mm. of the margin in 1 and 2 ; an obscure whitish spot at end of blue streak in 2 and a long narrow white spot at end of cell in 4 ; a very fine black line closing the cell.

Upperside hind wing : dark greyish black ; blue basal patch from veins 1–6 restricted and rounded distally ; black grey margin 5 mm. wide ; space 6 black grey and space 7 whitish.

Underside : as in the male, but paler, dark markings more brownish ; basal and postdiscal marking linear and pale brown.

Length of fore wing : ♂ 17 mm., ♀ 19 mm.

Holotype ♂. UGANDA : Bwamba, Mongiro Forest, xi.1961 (*T. H. E. Jackson*).
Allotype ♀. Same data as holotype, v.1962.

Recorded only from the type locality.

***Epitola mirifica* sp. n.**

(Pl. 5, fig. 65 ; Pl. 6, fig. 78)

This species agrees on the underside with the description of *lamborni* Baker, but since the type, a female, is lost and there are no females from the République du Congo, and since, moreover, the locality of *lamborni* belongs to a different faunal zone, it seems safer to treat it as a distinct species.

♂. Eyes very dark brown ; legs brown heavily overlaid with white scales ; palps white with black tips ; frons dark brown ; antennae black above, checkered white below ; club yellow tipped.

Upperside fore wing : blue patch darker and more restricted than in the other two species but less so than in *albomaculata* ; space 6 only blue in the base ; space 5 blue area invaded near distal end by a small black triangle of the ground colour ; distal edge of blue patch slightly concave ; vein 1 slightly swollen but little darkened at base, the discocellular not swollen.

Upperside hind wing : as in the other species but black marginal border double as wide ; costal black border paler distally.

Underside fore wing : white with black markings as in *liana* Roche ; submarginal and marginal sagittate lines distinct and not clouded ; postdiscal line not so deeply incised in 4 ; basal and sub-basal marks as in *cyanea* sp. n., but black.

Underside hind wing : very similar to *cyanea* but all markings black and much more distinct ; the white bands in both wings are intermediate in width between *dubia* sp. n. and *cyanea* ; all markings very clear and precise.

Length of fore wing : 19 mm.

♀. Unknown.

Holotype ♂. RÉPUBLIQUE DU CONGO : Moyen Congo, Etoumbi, x.1960 (*T. H. E. Jackson*).

Recorded from RÉPUBLIQUE DU CONGO : Moyen Congo.

The new technique of building ladders up *Crematogaster* trees and collecting from platforms in the canopy has produced, amongst others, two new species of the *pinodes* group.

***Epitola subgriseata* sp. n.**

(Pl. 5, figs. 76, 77 ; Pl. 6, figs. 89, 90)

Near *kamengensis* Jackson, but larger and with blue markings fore wing.

♂, ♀. Eyes brown ; legs dark brown, paler at the joints ; palps dark brown with much grey scaling below, dark brown above ; frons dark brown ; antennae black, checkered white below ; club orange tipped.

♂. *Upperside fore wing :* black ; dark blue spots as follows : space 1 blue from base to within 4 mm. of margin ; a very few blue scales in 1a ; a large quadrate blue spot midway in 2 ; a streak in base of cell and two circular blue spots in centre and apex very lightly scaled; small, lightly scaled, postdiscal blue spots in 5 and 6.

Upperside hind wing : blue from vein 1 to vein 6, but small streak of black ground colour into this area near the origin of vein 7 ; no defined black border.

Underside fore wing : light grey brown ; lower half of cell and bases of 1, 2, 3, 4 and 5 dark sepia, forming the usual dark lower central area of this group ; large silvery grey spot in 1 beyond this patch and another smaller spot in 2 ; small grey post-discal spots in 5, 6 and 7 and two others submarginal in 2 and 3.

Underside hind wing : light grey brown ; whole postdiscal area from inner margin to vein 5 heavily overlaid with silver grey ; marginal and submarginal area and distal half of costal margin irrorated with silver grey ; some scattered silver grey spots in the base.

♀. *Upperside fore wing :* black ; elongate square white post-discal spots in 5 and 6 and white streaks of the same series in 4 and 7 ; a large elongate quadrate white spot in the centre of 2 ; all these spots have faint blue edges ; space 1 blue from base to 4 mm. of margin ; space 1a blue from base to centre.

Upperside hind wing : smoky black ; blue with much brown scaling from vein 1 to vein 6, with some scattered blue scales above this ; margin black, about 1 mm., but ill-defined.

Underside fore wing : brownish grey ; white post-discal spots in 1, 2, 4, 5, 6 and a streak in 7, that in 1 being large, quadrate, 6 mm. long ; large black lower discal and post-discal patch, from base covering lower cell basal halves of 2–5 and continuing round the white post-discal spots in 1 and 2 almost to the margin ; margin and apex silvery grey.

Underside hind wing : smoky black, but almost entirely overlaid with thick silver grey, only the base and cell not so heavily scaled whitish and even here some scattered silver spots ; dark crenulate lines of the ground colour visible in the silver grey scales submarginal and postdiscal.

Length of fore wing : ♂ and ♀ 19 mm.

Holotype ♂. UGANDA : Bwamba, Mongiro, xi.1961 (*T. H. E. Jackson*).

Allotype ♀. Same data as holotype.

Recorded only from the type locality.

Epitola bwamba **sp. n.**

(Pl. 5, fig. 66 ; Pl. 6, fig. 79)

Nearest to *maculata* Hawker-Smith and belonging to the subgroup of *azurea* Jackson, *mpangensis* Jackson, *cephena* Hewitson, etc.

Through the courtesy of the authorities of M.R.A.C., Tervuren, who forwarded the type of *maculata* to the British Museum (Nat. Hist.) for photographing, I am now able to distinguish this species.

♂. Eyes brown ; legs dark brown, silvery white at the joints, basally heavily scaled silver ; palps grey-scaled with black tips ; frons hairy, blackish ; antennae black above, checkered white below ; club orange tipped.

Upperside fore wing : black with beautiful ultramarine blue spots as follows : some blue scales in the base of the cell, a small elongate spot in the centre and a larger more rounded spot at the end of the cell ; the whole of the base of 1, above vein 1a for 5 mm. and a large rounded spot in the base of 2, blue ; very faint traces of three post-discal blue spots beyond the cell in 4, 5 and 6 ; in *maculata* these spots are very prominent and in addition there are blue streaks in the base and beyond the cell.

Upperside hind wing : black from costa to vein 6, remainder ultramarine blue except for a fine black marginal border ; some scattered blue scales in 7 ; veins not blackened ; sometimes a very fine black line at end of cell ; in *maculata* the blue colour is not so bright, all veins are heavily blackened and there is a thick black line at end of cell ; further the black marginal border is double as broad and the blue colour reaches vein 7.

Underside : very similar to that of *maculata* and differing mainly in the heavy silver scaling and the silvery spot in 5 of the hind wing ; in *maculata* the usual lines on the hind wing are more prominent.

Underside fore wing : silvery grey with the usual large black area from inner margin to vein 5 ; space 1a paler and some silvery spots midway in 1 and 2 ; small silvery post-discal spots in 4, 5 and 6 ; traces of two subapical, silvery crescentric lines.

Underside hind wing : silvery grey, heavily overlaid with silver scales ; an obscure small silvery spot midway in 5, some very obscure silvery crescentric submarginal lines.

Length of fore wing : 15 mm. (*maculata* 16 mm.).

Holotype ♂. UGANDA : Bwamba, Mongiro, v.1962 (*T. H. E. Jackson*).

Recorded from the type locality only.

Note : A single female has been received, which appears to belong to this species and also a single female which agrees with *maculata*, but it is felt wiser to await further material before description. The females, if correct, place both species in subgroup B of the *pinodes* group.

Epitola intermedia Roche

(Pl. 7, fig. 91 ; Pl. 8, fig. 103)

♀ *Epitola intermedia* Roche ; Jackson, 1962 : 131, pl. 1, fig. 6, pl. 2, fig. 15.

It is regretted that the female described and figured in the above paper is incorrect and is referable to *Epitola cercenoides* Holland. The true female has now been taken in series from Bwamba, Uganda and is described below.

♀. Nearest to *cercene* Hewitson, but differs as follows : eyes brown ; palps sepia above and below ; legs pale brown, spotted white at the joints ; antennal shaft black above checkered white below ; club orange tipped.

Upperside fore wing : black, with large white postdiscal area from 1a–6, distally almost triangular in outline and extending nearest the margin in space 2. whereas in *cercene* there is also a prolongation in 1 ; base blue to end of cell and extending almost vertically to vein 1a ; space 1a and costal margin black ; a large triangular black spot at end of cell contiguous with costal margin.

Upperside hind wing : sepia brown, immaculate, slightly paler along costa.

Underside fore wing : pale ochreous grey ; the white postdiscal patch reproduced as above, but almost reaching the costa and covering also space 1a, but not reaching the margin ; base ochreous grey with some silvery grey spots basal and sub-basal ; a long dark grey spot in the base of space 1 as in the male ; apical area with two crescentric silvery grey submarginal lines.

Underside hind wing : ochreous grey, with two submarginal and one postdiscal silvery grey crescentric lines, the crescents in 5 and 6 of the latter expanded and solid, i.e. appearing as two triangular silvery spots ; some small silvery streaks basal and sub-basal ; in *cercene* there is no trace of the basal dark grey spot in fore wing and the white area reaches the margin in space 1 and extends into the base in 1 and 2.

Length of fore wing : 20 mm.; on average slightly smaller than *cercene*.

Neallotype ♀. UGANDA : Bwamba, Mongiro Forest, xi.1961 (*T. H. E. Jackson*).

Recorded from RÉPUBLIQUE DU CONGO : Etoumbi ; UGANDA : Bwamba, Katera and Bugoma.

Epitola viridana Joicey & Talbot

♀ *Epitola orientalis* Roche ; Jackson, 1962 : 143, pl. 5, fig. 42, pl. 6, fig. 52.

The female from Kakamega, Kenya, described as the female of *orientalis* Roche is incorrect and belongs to *viridana* Joicey & Talbot. Since the publication of Jackson (1962), males have been received from the same area and prove to be a large, dark and well-marked form of *viridana*. The female of *orientalis*, therefore, remains unknown.

Epitola elissa Grose-Smith

Add to synonymy :—

♂ *Epitola elissa* Grose-Smith ; Grose-Smith & Kirby, iv.1902 : *Afr. Lyc.* 144, pl. 30, figs. 3, 4.

Epitola dolorosa Roche

Fresh material of this species reveals the fact that the discal area of the fore wing in the male is covered with lustrous scales (not mentioned by Roche). It belongs therefore to the *sublustris* group, which now contains five species.

It is the opinion of the author that the female figured and described by Roche (1954) is a female of *viridana* Joicey & Talbot and that the true female is unknown.

Epitola badura Kirby

Add to synonymy :—

♀ *Epitola leonina* Staudinger ; Grose-Smith & Kirby, iv.1891 : *Afr. Lyc.* pl. 13, figs. 7, 8.

The female figured by Grose-Smith & Kirby is obviously *badura* Kirby ; the female of *leonina* Staudinger has a prominent black line across the fore wing discocellular as in the male. It is certainly not the female of *dunia* Kirby as stated in the text, which belongs to subgroup " D " of the *carcina* group.

Epitola hewitsoni Mabille

♂ *Epitola hewitsoni* Mabille, 1877 : 221.
♂ *Epitola hewitsoni* Mabille ; Jackson, 1962 : 126, pl. 13, figs. 124, 130.
♀ *Epitola stempfferi* Jackson, 1962 : 127, pl. 13, figs. 123, 129.

A series of this species has recently been received from Kelle, Moyen Congo, and it is now virtually certain that the female described as allotype ♀ *Epitola stempfferi* Jackson, 1962, is in fact the female of *hewitsoni*, and is designated the neallotype ♀ of *Epitola hewitsoni* Mabille.

A comparison of the original photographs of *Epitola stempfferi* with Jackson (1962, pl. 13, figs. 122, 128, 123, 129), shows that the reproduction has not been very successful. The pale subapical and marginal spots, fig. 129, have been enlarged and are, in fact, much smaller ; further the dark markings on the underside hind wing, figs. 128, 129, are not all of the same tone as shown in the plate. The distal and costal markings are much paler and contrast sharply with the basal and discal spots. The original photo is identical with females received together with males of *hewitsoni*. The localities Kelle and Ketta are much closer to each other than they are to Douano, Gabon, the type locality of the male of *Epitola stempfferi*.

Neallotype ♀. RÉPUBLIQUE DU CONGO : Ouesso, Ketta Forest, vii.1959 (*T. H. E. Jackson*).

Note : The locality Cabinda is in Portuguese Congo, not Angola.

EPITOLINA Aurivillius

A certain amount of confusion has always existed over the identity of the species in this genus and the following note may help to clear this up.

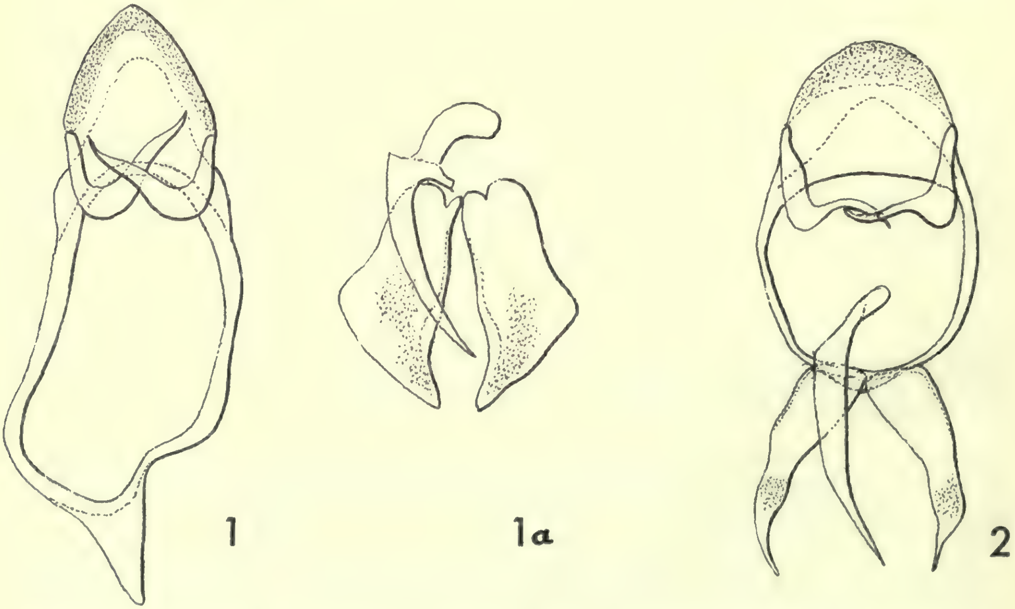
The types of *dubia* Kirby and *cordelia* Kirby were in the Staudinger collection but now cannot be found, and these two should be considered, as before, to be synonyms of *dispar* Kirby. *E. melissa* H. Druce is merely a form occurring among typical *dispar*, although in Uganda and the eastern Congo it is the dominant form.

There remain, therefore, at present only two species *dispar* and *catori* and these may be distinguished as follows :—

catori Baker. Fringes checkered ; ♀, fore wing with orange discal patch ; ♂ genitalia, Text-fig. 1.

dispar Kirby. Fringes plain ; ♀, plain brown.

The ♂ genitalia, Text-fig. 2.



FIGS. 1–2, ♂ genitalia. 1 and 1a *Epitolina catori* Baker, tegumen and valves with aedeagus. (Uganda : Mpigi). 2 *Epitolina dispar* Kirby.

HEWITSONIA Kirby

A single male of an interesting species with female-like fascies and coloration, i.e. brown and white, was taken in 1961 by Mr. N. Mitton of the Coryndon Museum, Nairobi. It was at first thought to be an *Epitola* close to *Epitola crippsi* Stoneham, and was eventually submitted to Monsieur H. Stempffer of Paris, who reported as follows :—" from the venation and general fascies, it is a *Hewitsonia*, since the lower discocellular of the hind wing, covered below by a small black stigma, is practically straight and not concave as in *Epitola*. But from the genital armature it is close to the subgroup of *Epitola posthumus* Fabricius and *urania* Kirby since dorsally the penis is very convex near the base, a character not present in *Hewitsonia* or in any other species of *Epitola*. In my opinion this species should be described as a *Hewitsonia*."

The male in question has a fringe of long hair attached to vein 1 and covering the whole of space 1a for two-thirds of its length, a character present also in *Hewitsonia similis* Aurivillius.

An examination of *Epitola crippsi* Stoneham shows that the lower discocellular of the hind wing is vertical and perfectly straight. This, then, must also be a *Hewitsonia*. It is possible that a new genus, or at the least, sub-genus, should be erected for these two species, since they differ considerably from the rest of the *Hewitsonia*.

Hewitsonia crippsi Stoneham **comb. n.**

♀ *Epitola crippsi* Stoneham, 1933 : 1, pl. 2.
Type. KENYA : Soy (Stoneham Mus., Kenya).

Hewitsonia mittoni **sp. n.**

(Pl. 1, fig. 6 ; Pl. 2, fig. 20 ; Text-fig. 3)

♂. Nearest to *Hewitsonia crippsi* Stoneham. Eyes brown ; palps basally yellow below, white above with black tips ; frons laterally white, medially brown ; legs pale yellow ; antennal shaft black checkered minutely white below ; club broadly flattened, entirely black. Anatomically speaking these characters agree with *Hewitsonia crippsi*, but not with any other species of *Hewitsonia* or *Epitola*.

Upperside fore wing : wings shaped as in *crippsi*, i.e. emarginate between veins 2 and 4 ; black, brownish towards the base in cell and space 1 ; four large elongate white spots, post-discal, in 4–7 inclusive and a small white streak in 8 ; a large quadrate white spot also postdiscal in 2 near the margin ; a fringe of long brown hair attached to vein 1 and covering the whole of 1a to within 2 mm. of the margin.

Upperside hind wing : brown, immaculate ; fringes whitish.

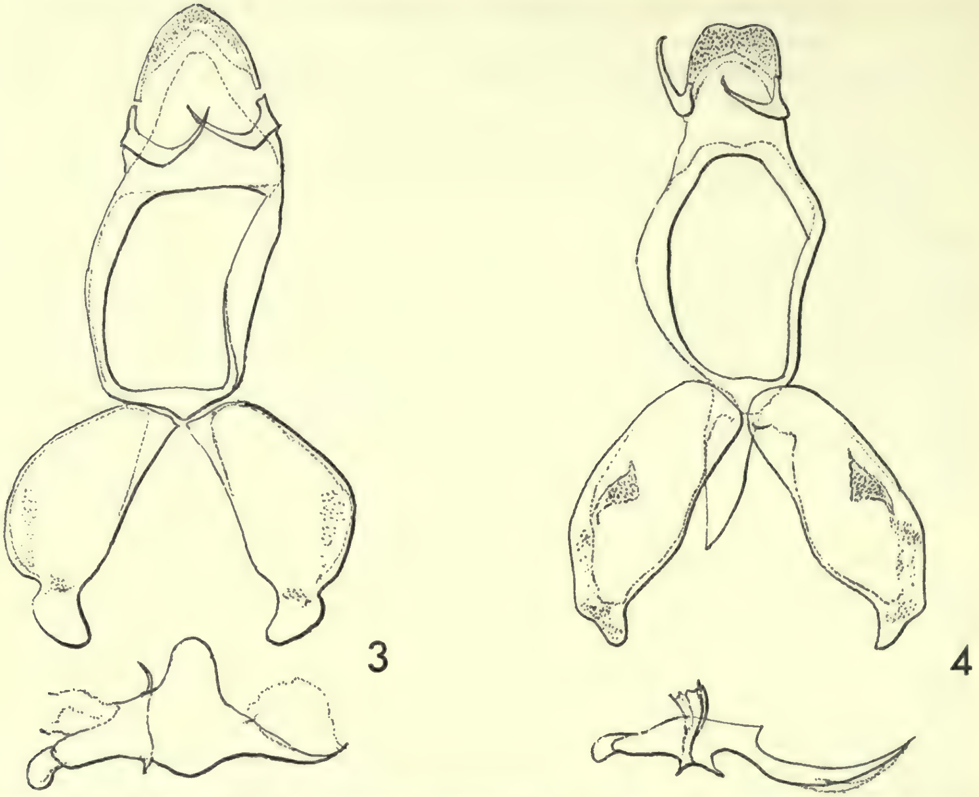
Underside fore wing : black, paler in space 1a ; apex silvery white to vein 4 with a small additional silver spot in the margin of space 3 ; veins brown ; white post-discal spots as above, divided from the apical area by a narrow crenulate black line ; costa broadly silvery white from base to post-discal spots.

Underside hind wing : silvery white ; round jet black spots in the basal area as follows : 4, sub-basal, almost in line, in 1, the cell, 7 and 8 ; three, discal, two in cell and one in 7, also in line ; two at end of cell ; distal and inner-marginal area streaked with brown along the veins ; an irregular brown postdiscal streak from costa to vein 6 and a brown quadrate spot in the margin of 5.

Length of fore wing : 24 mm.

Holotype ♂. UGANDA : Toro, Bwamba, ix.1961 (*N. Mitton*).

Named after Mr. N. Mitton of the Coryndon Museum, Nairobi, who discovered this interesting species.



FIGS. 3–4, ♂ genitalia. 3 *Hewitsonia mittoni* sp. n. Holotype. (Uganda : Bwamba). 4 *Neoepitola barombiensis* Kirby comb. n. (Uganda : Bwamba).

NEOEPITOLA gen. n.

Type species. *Epitola barombiensis* Kirby.

It was discovered, but too late to be included in the revision of the genus *Epitola* Westwood (Jackson, 1962), that the venation of *Epitola barombiensis* Kirby differed from that of all known African Lycaenidae, and it therefore belongs to a new genus. Monsieur H. Stempffer of Paris considers that the differences are sub-generic, but it is felt by the present author that the venation, together with the unique underside pattern, are sufficient to accord this species specific rank and that, furthermore, sub-genera are not very convincing taxonomic units.

Differs from all other known African Lycaenidae by the venation of the fore wings, which has been checked over a long series ; vein 11 arises not from the apex of the cell, but branches from vein 10 about 1 mm. from its origin. It continues close to vein 12, but without touching it. The male genitalia differ in certain particulars from those of *Epitola* ; the valve carries a sort of subtriangular harp furnished with short spines about midway along its length. The penis is deeply incised both dorsally and ventrally, the shape being that of a sickle. On the upperside the sexes conform in colour and pattern to *Epitola* and *Phytala*, but the underside is unlike that of any other African lycaenid and is well described by Roche (1954) as having a " scorched appearance ".

Eyes smooth ; antennal shaft checkered black and white above and below, less than half as long as costa ; club broadly flattened and club-shaped ; second segment of palps broad and flattened ; third segment small, thin and pointed ; palps clothed in long hair ; legs jet black with small white spots at the joints ; frons and thorax covered with long hair ; vein 1 swollen at base and the lower discocellular throughout its length.

Neoepitola barombiensis Kirby **comb. n.**

(Text-figs. 4, 5)

Epitola barombiensis Kirby, 1890 : 274.

♂ *Epitola barombiensis* Kirby ; Grose-Smith & Kirby, iv.1892 : *Afr. Lyc.* pl. 17, figs. 11, 12.

Type. Cameroons : Barombi (Coll. Staudinger, Berlin).

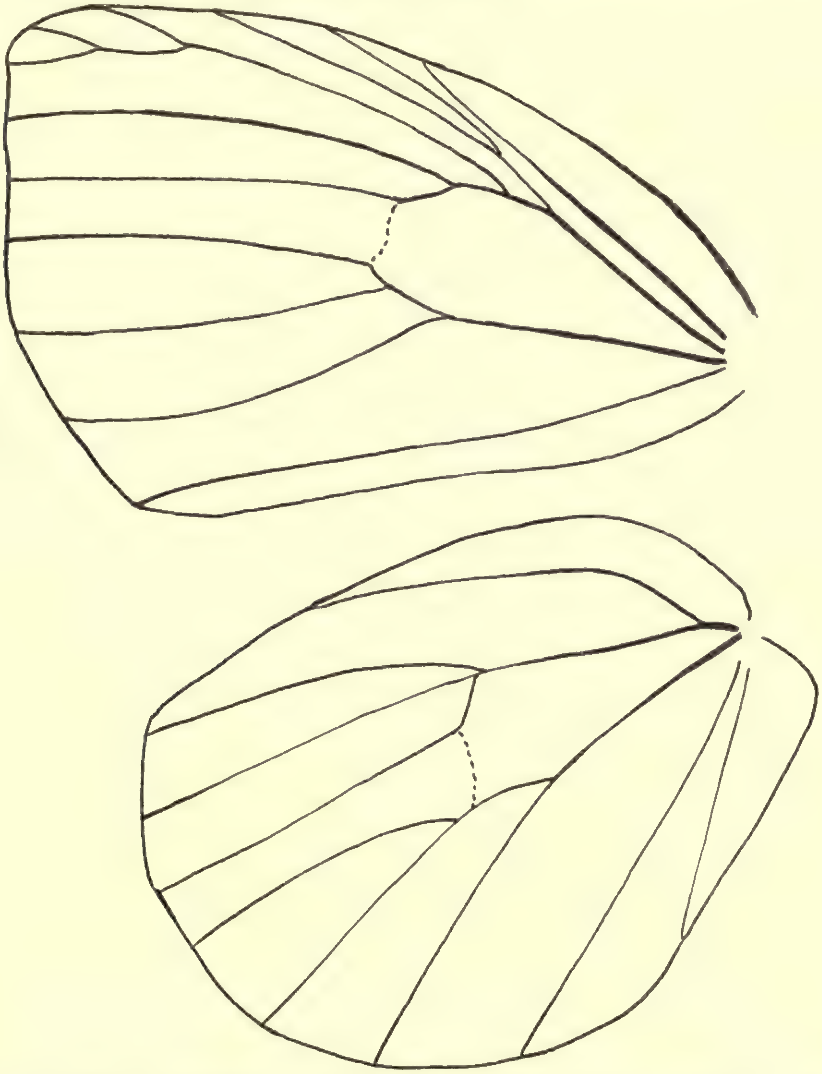


Fig. 5, *Neoepitola barombiensis* Kirby comb. n. ♂ venation. (Uganda : Bwamba. Mongiro).

ACKNOWLEDGEMENTS

My thanks are due to the Keeper and staff of the Entomological Department, British Museum (Natural History) for all the facilities and much help and advice in writing this paper ; to Dr. H. J. Hannemann, Humboldt Universität, Berlin, for the loan of many types ; to Monsieur H. Stempffer of Paris who was responsible for the discovery of the new genus ; and to Mr. Harry K. Clench, Carnegie Museum, Pittsburgh, for drawings of the venation. Also to the authorities of the Musée Royal d'Afrique Centrale, Tervuren, Belgium for the loan of the type of *Epitola maculata* Hawker-Smith.

Note : The opportunity is taken here to state that all types quoted by Monsieur H. Stempffer and others as being in the T. H. E. Jackson collection are now in the British Museum (Natural History).

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PLATE 1

FIGS. 1–5 and 7–14 *Phytala* Westwood
FIG. 6 *Hewitsonia* Kirby

FIGS. 1 and 2. *Phytala elais ugandae* ssp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba Forest, Semliki Valley. Photos. Brit. Mus. (N.H.) Nos. 34748, 34768.

FIGS. 3 and 4. *P. vansomereni* sp. n., Holotype ♂, Uganda : Masaka, Sango Bay, Katera, Allotype ♀, Uganda : Entebbe, respectively. Photos. Brit. Mus. (N.H.) Nos. 34750, 34770.

FIG. 5. *P. hyetta* Hewitson, Holotype ♂, Angola. Photo. Brit. Mus. (N.H.) No. 34756.

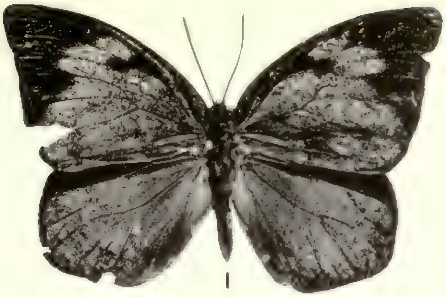
FIG. 6. *Hewitsonia mittoni* sp. n., Holotype ♂, Uganda, Toro, Bwamba. Photo. Brit. Mus. (N.H.) No. 34775.

FIGS. 7 and 8. *Phytala hyettoides* Aurivillius, ♂, and Neallotype ♀, Sierra Leone : Kohlifa, respectively. Photos. Brit. Mus. (N.H.) Nos. 34752, 34772.

FIGS. 9 and 10. *P. hyettina* Aurivillius, ♂, and Neallotype ♀, Sierra Leone, Moyamba, respectively. Photos. Brit. Mus. (N.H.) Nos. 34758, 34776.

FIGS. 11 and 12. *P. intermixta* Aurivillius, ♂, and Neallotype ♀, République du Congo : Moyen Congo, Etoumbi, respectively. Photos. Brit. Mus. (N.H.) Nos. 34754, 34778.

FIGS. 13 and 14. *P. aequatorialis* sp. n., Holotype ♂ and Allotype ♀ respectively, both Nigeria : Lagos District, Oshodi. Photos. Brit Mus. (N.H.) Nos. 34760, 34780.



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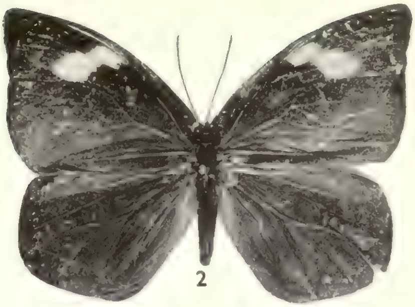

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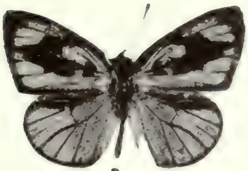

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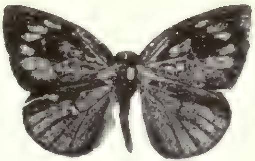

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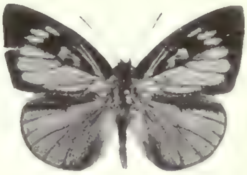

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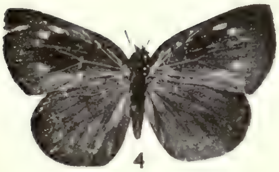

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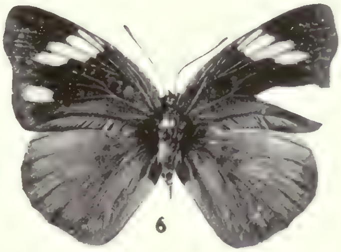

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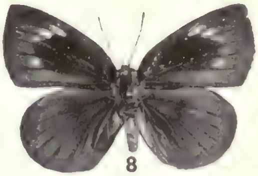

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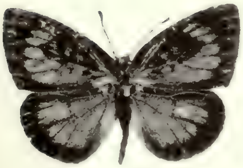

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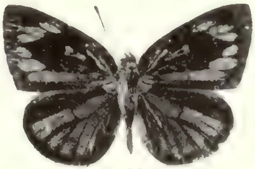

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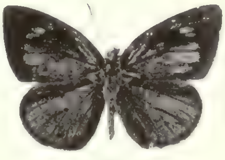

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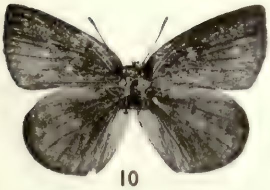

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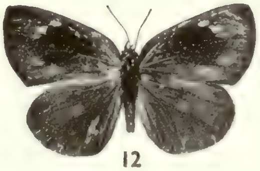

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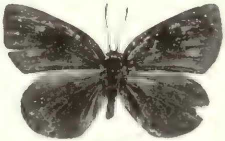

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PLATE 2

(Undersides)

FIGS. 15–19 and 21–28 *Phytala* Westwood

FIG. 20 *Hewitsonia* Kirby

FIGS. 15 and 16. *Phytala elais ugandae* ssp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba Forest, Semliki Valley. Photos. Brit. Mus. (N.H.) Nos. 34749, 34769.

FIGS. 17 and 18. *P. vansomereni* sp. n., Holotype ♂, Uganda : Masaka, Sango Bay, Katera, Allotype ♀, Uganda : Entebbe, respectively. Photos. Brit. Mus. (N.H.) Nos. 34751, 34771.

FIG. 19. *P. hyetta* Hewitson, Holotype ♂, Angola. Photo. Brit. Mus. (N.H.) No. 34757.

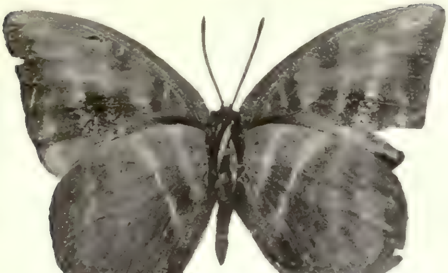
FIG. 20. *Hewitsonia mittoni* sp. n., Holotype ♂, Uganda, Toro, Bwamba. Photo. Brit. Mus. (N.H.) No. 34776.

FIGS. 21 and 22. *Phytala hyettoides* Aurivillius, ♂, and Neallotype ♀, Sierra Leone : Kohlifa, respectively. Photos. Brit. Mus. (N.H.) Nos. 34753, 34773.

FIGS. 23 and 24. *P. hyettina* Aurivillius, ♂, and Neallotype ♀, Sierra Leone, Moyamba, respectively. Photos. Brit. Mus. (N.H.) Nos. 34759, 34776.

FIGS. 25 and 26. *P. intermixta* Aurivillius, ♂, and Neallotype ♀, République du Congo : Moyen Congo, Etoumbi, respectively. Photos. Brit. Mus. (N.H.) Nos. 34755, 34779.

FIGS. 27 and 28. *P. aequatorialis* sp. n., Holotype ♂ and Allotype ♀ respectively, both Nigeria : Lagos District, Oshodi. Photos. Brit. Mus. (N.H.) Nos. 34761, 34781.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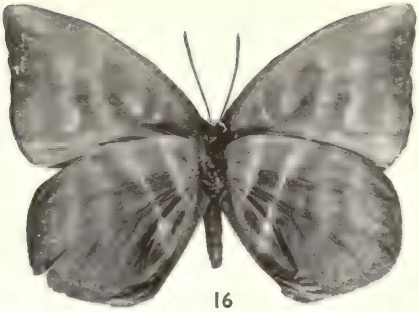
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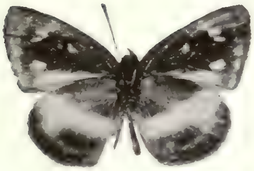
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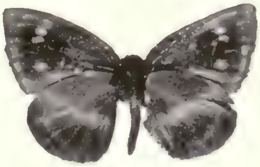
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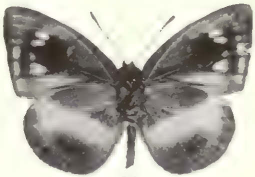
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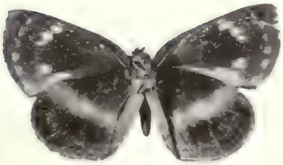
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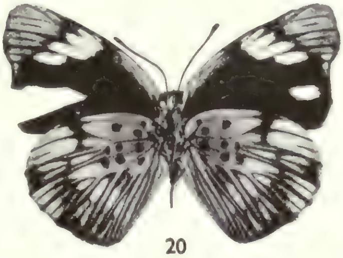
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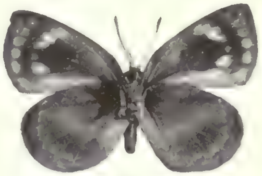
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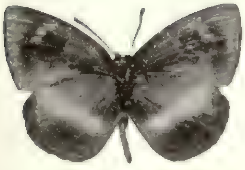
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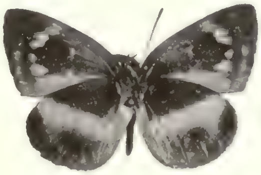
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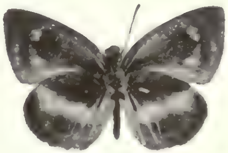
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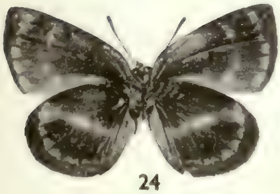
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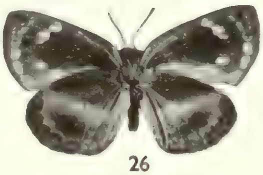
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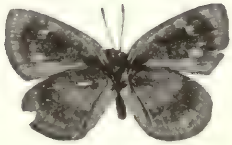
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PLATE 3

FIGS. 29–40, *Phytala* Westwood
FIGS. 41–46, *Epitola* Westwood

FIGS. 29 and 30. *Phytala henleyi* Kirby, ♂ and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34762, 34782.

FIGS. 31 and 32. *P. schultzei* Aurivillius, Neotype ♂, République du Congo : Ouesso, Ketta Forest, and Neallotype ♀, République du Congo ; Moyen Congo, Mambili Forest respectively. Photos. Brit. Mus. (N.H.) Nos. 34764, 34784.

FIGS. 33 and 34. *P. reducta* Aurivillius, Neotype ♂ and Neallotype ♀ respectively, both République du Congo : Ouesso, Mambili Forest. Photos. Brit. Mus. (N.H.) Nos. 34766, 34786.

FIGS. 35 and 36. *P. pulchra* sp. n., Holotype ♂ and Allotype ♀ respectively, both République du Congo : Ouesso, Ketta Forest. Photos. Brit. Mus. (N.H.) Nos. 34788, 34800.

FIGS. 37 and 38. *P. benitensis* Holland, ♂ and Neallotype ♀, Cameroons : Bitje, respectively. Photos. Brit. Mus. (N.H.) Nos. 34790, 34802.

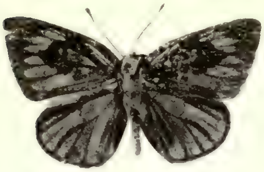
FIG. 39. *P. nigrescens* sp. n., Holotype ♂, Nigeria : Onitsha Province, Mamu, Awka. Photo. Brit. Mus. (N.H.) No. 34792.

FIG. 40. *P. rezia* Grose-Smith and Kirby (comb. n.), Allotype [♀] = ♂, Cameroons. (Coll. Staudinger, Berlin). Photo. Brit. Mus. (N.H.) No. 31872.

FIGS. 41 and 42. *Epitola albomaculata* Baker, Holotype ♂ and Neallotype ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34794, 34804.

FIGS. 43 and 44. *E. dubia* sp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba, Mongiro. Photos. Brit. Mus. (N.H.) Nos. 34796, 34806.

FIGS. 45 and 46. *E. cyanea* sp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba, Mongiro. Photos. Brit. Mus. (N.H.) Nos. 34798, 34808.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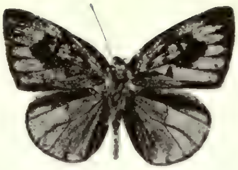
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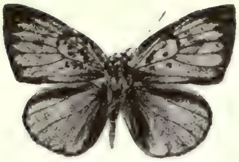
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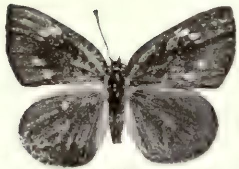
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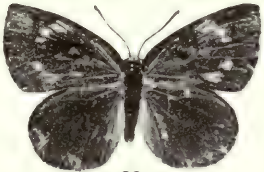
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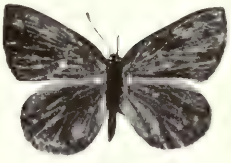
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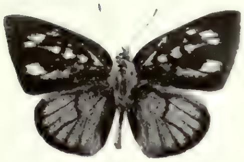
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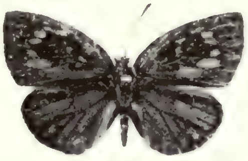
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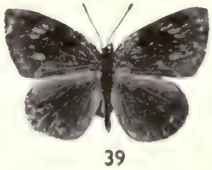
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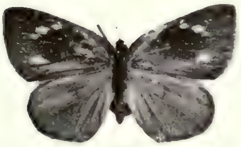
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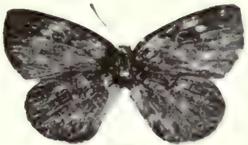
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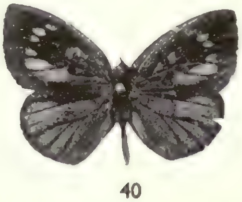
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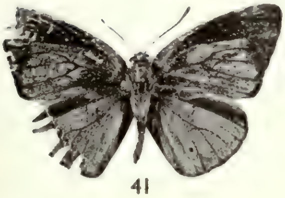
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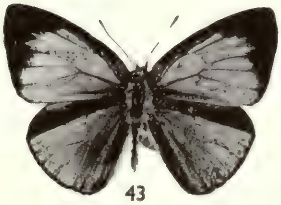
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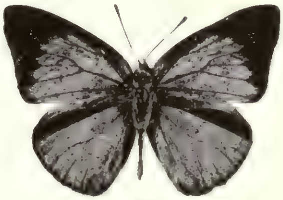
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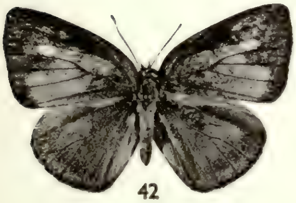
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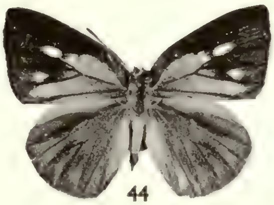
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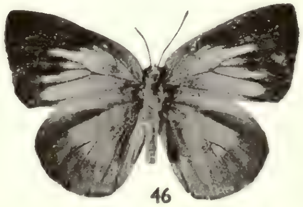
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PLATE 4
(Undersides)

FIGS. 47–58, *Phytala* Westwood
FIGS. 59–64, *Epitola* Westwood

FIGS. 47 and 48. *Phytala henleyi* Kirby, ♂ and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34763, 34783.

FIGS. 49 and 50. *P. schultzei* Aurivillius, Neotype ♂, République du Congo : Ouesso, Ketta Forest, and Neallotype ♀, République du Congo : Moyen Congo, Mambili Forest respectively. Photos. Brit. Mus. (N.H.) Nos. 34765, 34785.

FIGS. 51 and 52. *P. reducta* Aurivillius, Neotype ♂ and Neallotype ♀ respectively, both République du Congo : Ouesso, Mambili Forest. Photos. Brit. Mus. (N.H.) Nos. 34767, 34787.

FIGS. 53 and 54. *P. pulchra* sp. n., Holotype ♂ and Allotype ♀ respectively, both République du Congo : Ouesso, Ketta Forest. Photos. Brit. Mus. (N.H.) Nos. 34789, 34801.

FIGS. 55 and 56. *P. benitensis* Holland, ♂, and Neallotype ♀, Cameroons : Bitje, respectively. Photos. Brit. Mus. (N.H.) Nos. 34791, 34803.

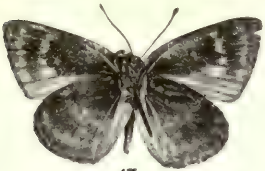
FIG. 57. *P. nigrescens* sp. n., Holotype ♂, Nigeria : Onitsha Province, Mamu, Awka. Photo. Brit. Mus. (N.H.) No. 34793.

FIG. 58. *P. rezia* Grose-Smith and Kirby (comb. n.), Allotype [♀] = ♂, Cameroons : (Coll. Staudinger, Berlin). Photo. Brit. Mus. (N.H.) No. 31871.

FIGS. 59 and 60. *Epitola albomaculata* Baker, Holotype ♂ and Neallotype ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34795, 34805.

FIGS. 61 and 62. *E. dubia* sp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba, Mongiro. Photos. Brit. Mus. (N.H.) Nos. 34797, 34807.

FIGS. 63 and 64. *E. cyanea* sp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba, Mongiro. Photos. Brit. Mus. (N.H.) Nos. 34799, 34809.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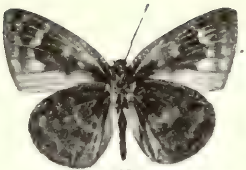
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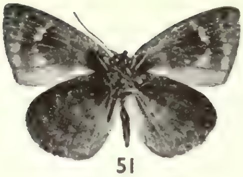
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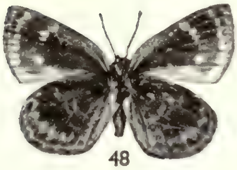
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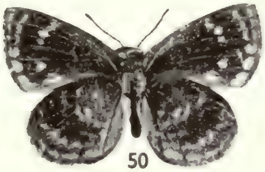
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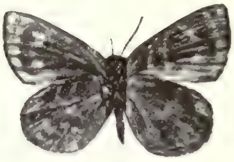
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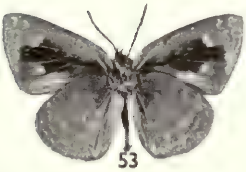
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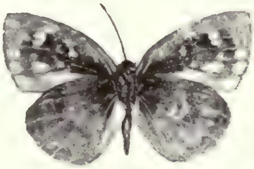
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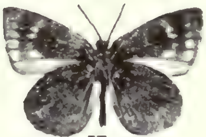
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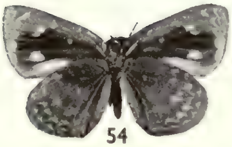
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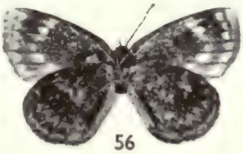
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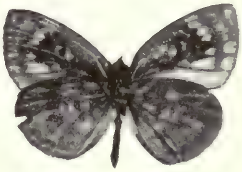
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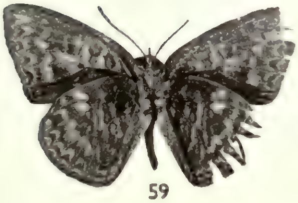
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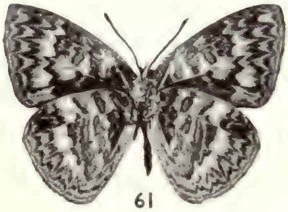
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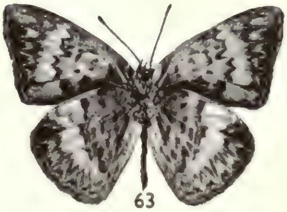
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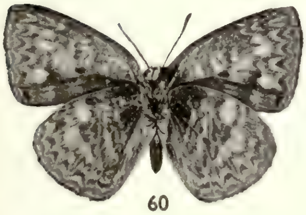
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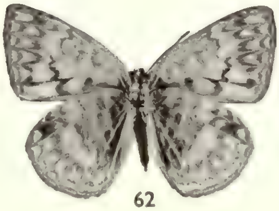
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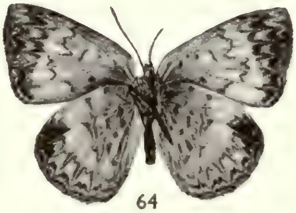

64

PLATE 5

Figs. 65–77, *Epitola* Westwood

Fig. 65. *Epitola mirifica* sp. n., Holotype ♂, République du Congo : Moyen Congo, Etoumbi. Photo. Brit. Mus. (N.H.) No. 34828.

Fig. 66. *E. bwamba* sp. n., Holotype ♂, Uganda : Bwamba, Mongiro. Photo. Brit. Mus. (N.H.) No. 34818.

Fig. 67. *E. maculata* Hawker-Smith, Holotype ♂ (Musée Royal d'Afrique Centrale, Tervuren). Photo. Brit. Mus. (N.H.) No. 33222.

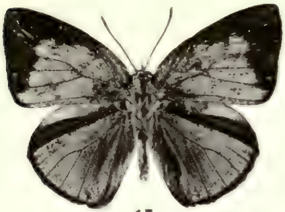
Figs. 68 and 69. *E. zelica* Kirby [♀] = ♂ Type (Humboldt Universität, Berlin) and ♀. Neallotype (=subalba Baker, Type) Photos. Brit. Mus. (N.H.) Nos. 31901, 33047.

Figs. 70 and 71. *E. gerina* Hewitson, ♂, and Neallotype ♀, République du Congo : Moyen Congo, Etoumbi respectively. Photos. Brit. Mus. (N.H.) Nos. 34810, 34820.

Figs. 72 and 73. *E. goodii* Holland sp. rev. Neallotype ♂, Uganda : Budongo, and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34814, 34852.

Figs. 74 and 75. *E. nitide* Druce, Holotype ♂ and Neallotype ♀, République du Congo : Moyen Congo, Kelle respectively. Photos. Brit. Mus. (N.H.) Nos. 33045, 34822.

Figs. 76 and 77. *E. subgriseata* sp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba, Mongiro. Photos. Brit. Mus. (N.H.) Nos. 34816, 34824.



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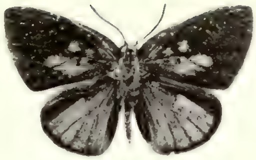

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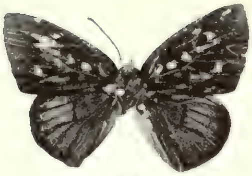

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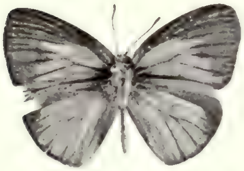

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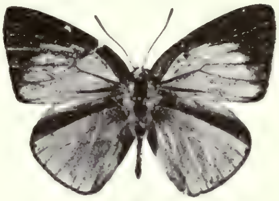

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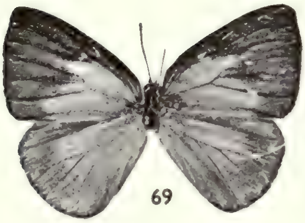

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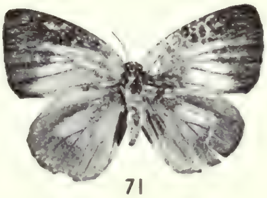

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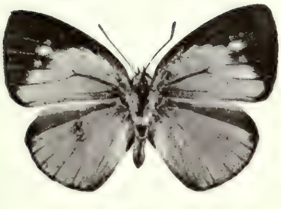

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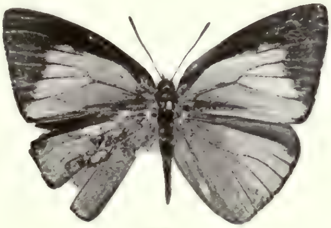

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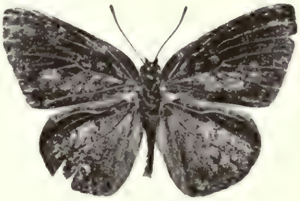

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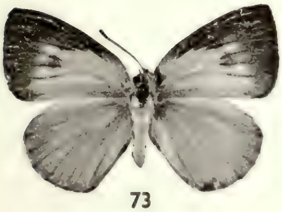

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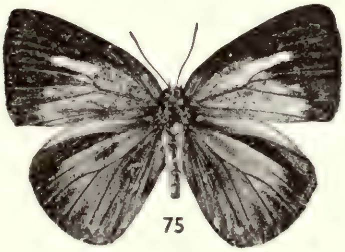

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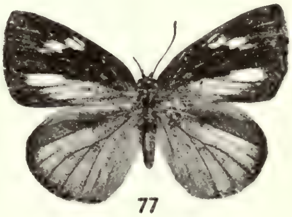

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PLATE 6

(Undersides)

FIGS. 78–90, *Epitola* Westwood

FIG. 78. *Epitola mirifica* sp. n., Holotype ♂, République du Congo : Moyen Congo, Etoumbi. Photo. Brit. Mus. (N.H.) No. 34829.

FIG. 79. *E. bwamba* sp. n., Holotype ♂, Uganda : Bwamba, Mongiro. Photo. Brit. Mus. (N.H.) No. 34819.

FIG. 80. *E. maculata* Hawker-Smith, Holotype ♂ (Musée Royal d'Afrique Centrale, Tervuren). Photo. Brit. Mus. (N.H.) No. 33223.

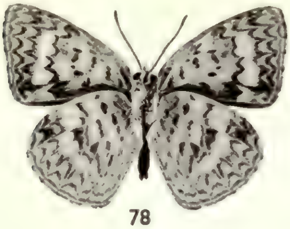
FIGS. 81 and 82. *E. zelica* Kirby [♀] = ♂ Type (Humboldt Universität, Berlin) and ♀ Neallotype = (subalba Baker, Type) Photos. Brit. Mus. (N.H.) Nos. 31902, 33048.

FIGS. 83 and 84. *E. gerina* Hewitson, ♂, and Neallotype ♀, République du Congo : Moyen Congo, Etoumbi respectively. Photos. Brit. Mus. (N.H.) Nos. 34811, 34821.

FIGS. 85 and 86. *E. goodii* Holland sp. rev. Neallotype ♂, Uganda : Budongo, and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34815, 34853.

FIGS. 87 and 88. *E. nitide* Druce, Holotype ♂ and Neallotype ♀, République du Congo : Moyen Congo, Kelle, respectively. Photos. Brit. Mus. (N.H.) Nos. 33046, 34823.

FIGS. 89 and 90. *E. subgriseata* sp. n., Holotype ♂ and Allotype ♀ respectively, both Uganda : Bwamba, Mongiro. Photos. Brit. Mus. (N.H.) Nos. 34817, 34825.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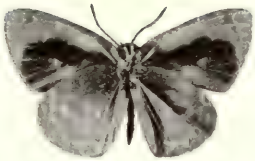
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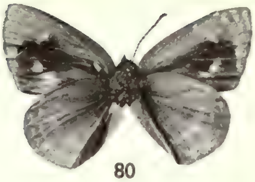
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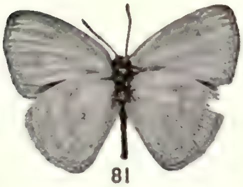
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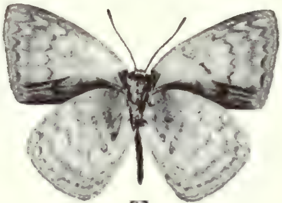
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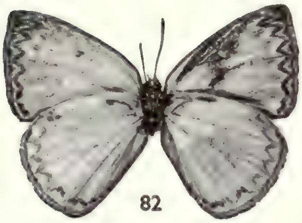
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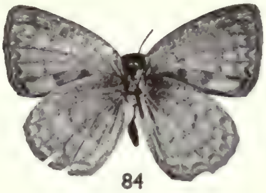
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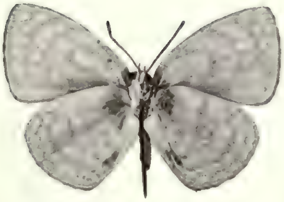
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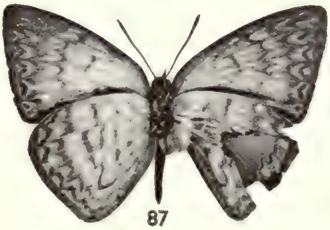
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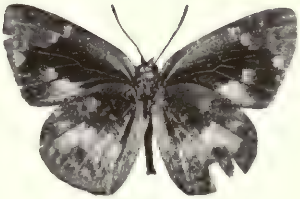
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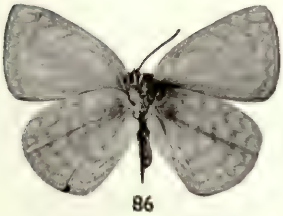
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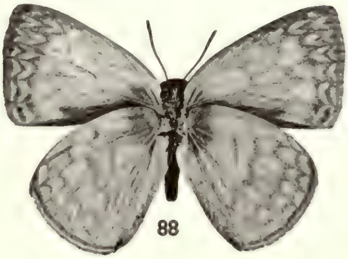
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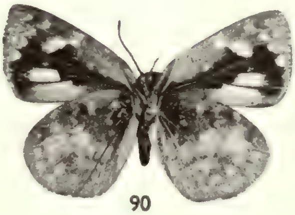
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PLATE 7

FIGS. 91–102, *Epitola* Westwood

FIG. 91. *Epitola intermedia* Roche, Neallotype ♀, Uganda : Bwamba, Mongiro. Photo. Brit. Mus. (N.H.) No. 34826.

FIG. 92. *E. semibrunnea* Baker, Holotype ♂. Photo. Brit. Mus. (N.H.) No. 24840.

FIGS. 93 and 94. *E. hewitsonoides* Hawker-Smith, Holotype ♂ and Allotype ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34830, 34842.

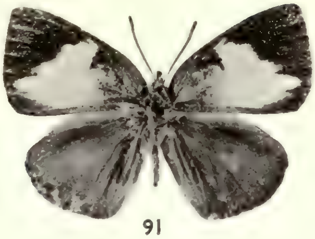
FIGS. 95 and 96. *E. congoana* Aurivillius, ♂ and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34832, 34844.

FIGS. 97 and 98. *E. nigra* Baker, Holotype ♂ and Allotype ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34834, 34846.

FIGS. 99 and 100. *E. sublustris* Baker, ♂ and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34836, 34848.

FIG. 101. *E. pinodes* Druce, ♂. Photo. Brit. Mus. (N.H.) No. 34838.

FIG. 102. *E. obscura* Hawker-Smith, Holotype ♂. Photo. Brit. Mus. (N.H.) No. 34850.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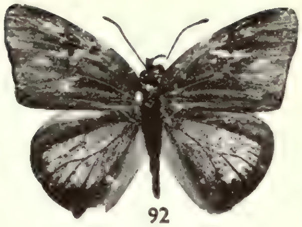
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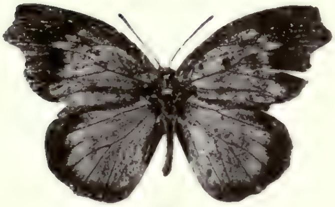
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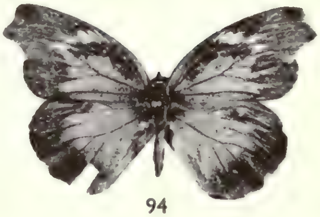
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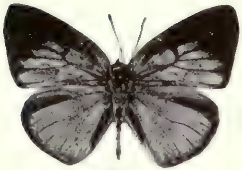
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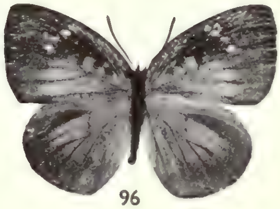
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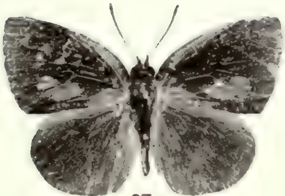
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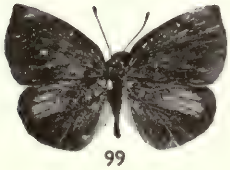
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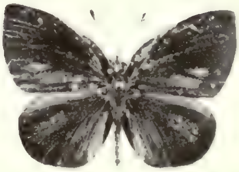
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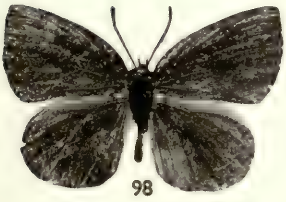
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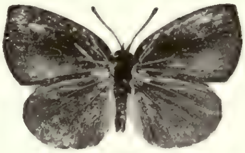
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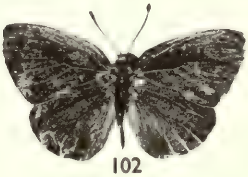
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PLATE 8
(Undersides)

FIGS. 103–114, *Epitola* Westwood

FIG. 103. *Epitola intermedia* Roche, Neallotype ♀, Uganda : Bwamba, Mongiro. Photo. Brit. Mus. (B.M.) No. 34827.

FIG. 104. *E. semibrunnea* Baker, Holotype ♂. Photo. Brit. Mus. (N.H.) No. 34841.

FIGS. 105 and 106. *E. hewitsonoides* Hawker-Smith, Holotype ♂ and Allotype ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34831, 34843.

FIGS. 107 and 108. *E. congoana* Aurivillius, ♂ and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34833, 34845.

FIGS. 109 and 110. *E. nigra* Baker, Holotype ♂ and Allotype ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34835, 34847.

FIGS. 111 and 112. *E. sublustris* Baker, ♂ and ♀ respectively. Photos. Brit. Mus. (N.H.) Nos. 34837, 34849.

FIG. 113. *E. pinodes* Druce, ♂. Photo. Brit. Mus. (N.H.) No. 34839.

FIG. 114. *E. obscura* Hawker-Smith, Holotype ♂. Photo. Brit. Mus. (N.H.) No. 34851.

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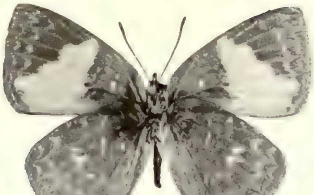
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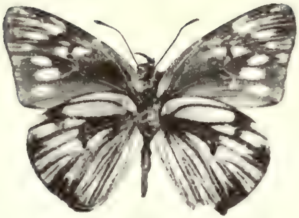
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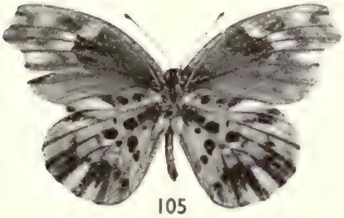
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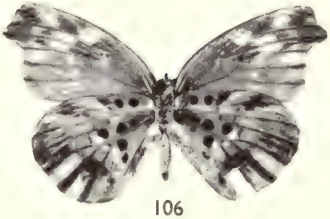
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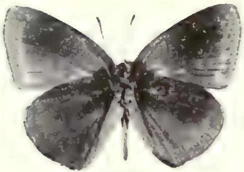
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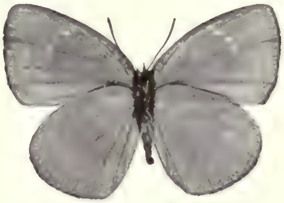
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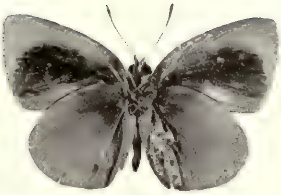
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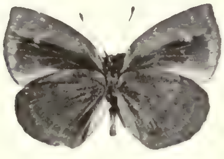
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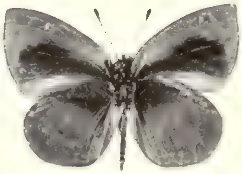
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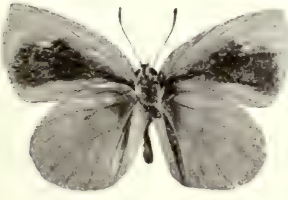
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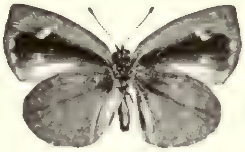
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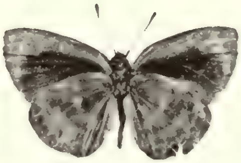
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22 JUL 1964
NATURAL HISTORY

ON THE DIPTERA OF NEPAL (STRATIOMYIDAE, THEREVIDAE AND DOLICHOPODIDAE)

DAVID HOLLIS

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 15 No. 4
LONDON: 1964

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BY

DAVID HOLLIS

lately of the Department of Entomology
British Museum (Natural History)

Pp. 81–116 ; 48 *Text-figures*

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Issued 21 July, 1964 *Price Thirteen Shillings*

ON THE DIPTERA OF NEPAL (STRATIOMYIDAE, THEREVIDAE AND DOLICHOPODIDAE)

By DAVID HOLLIS

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SYNOPSIS

Published and new records of Stratiomyidae, Therevidae and Dolichopodidae from Nepal are given. 2 new species of Therevidae ; 1 new genus, 22 new species (including 1 from Tibet) and 1 new subspecies of Dolichopodidae are described.

INTRODUCTION

THE dipterous fauna of Nepal is poorly known and this paper attempts to bring up to date both published and new records of Stratiomyidae, Therevidae and Dolichopodidae from this country.

The work was stimulated by the collections of two British Museum expeditions to Nepal. On the first expedition, in 1954, the Diptera were collected by Mr. J. Quinlan. The second expedition, during the winter of 1961–62, provided the bulk of material studied and this collection was made by Mr. R. L. Coe.

One new species, *Hercostomus kaulbacki* sp. n. from Tibet is described here because of the proximity of the locality and the unusual characteristics displayed by the fly.

A full bibliography of the recorded species is not given and only references to taxonomic changes and new locality records are stated.

Unless otherwise stated all type material is in the British Museum (Natural History).

The author would like to thank Mr. C. E. Dyte, of the Pest Infestation Laboratories, Slough, for his valuable advice and criticism ; Mr. W. N. Ellis, of the Zoölogisch Museum, Amsterdam, for the helpful loan of type material ; and Dr. Sadao Takagi, of the Entomological Institute, Hokkaido University, Sapporo, for his gift of type material to the British Museum.

STRATIOMYIDAE

Brunetti (1923), in his revision of the Oriental Stratiomyidae, records many species from Darjeeling and nearby districts, but in this and other relevant papers there is no record of Stratiomyidae from Nepal.

In the British Museum collection one species is represented from the area.

Ptecticus melanurus (Walker)

Ctenophora melanura Walker, 1848 : 78.
Ptecticus apicalis Loew, 1855 : 142.
Sargus luridus Walker, 1856 : 8.
Sargus leoninus Rondani, 1875 : 454.
Sargus melanurus (Walker) Osten Sacken, 1886 : 166.
Ptecticus aurifer Brunetti (nec Walker), 1920 : 78.
Ptecticus melanurus (Walker) Brunetti, 1923 : 138.

4 ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 ; 8 ♂, flying into pit latrine ; 1 ♂, xi.1961–i.1962 (*R. L. Coe*).

THEREVIDAE

As far as can be gathered there are no previous records of Therevidae from Nepal.

Two apparently undescribed species of this family are present in the British Museum collection.

***Thereva hinu* sp. n.**

(Text-figs. 1–6)

♂. Eyes contiguous over upper frons ; lower frons grey dusted with long, straight, intermingled grey and black hairs. Antennae grey-black and bearing silver and black hairs and black bristles. Face grey, thickly covered with long silver and black hairs. Occiput grey with a post-ocular fringe of long black hair-like bristles and a uniform covering of long silver hairs ventrally.

Dorsum of thorax grey with 3 vague brown longitudinal stripes and a uniform covering of thin black hairs ; 3 pre-sutural, 1 sutural, 2 supra-alar and 1 post-alar bristle present. Scutellum concolorous with dorsum with 4 marginal bristles and some long dark hairs. Pleurae grey, densely covered with long silver hairs.

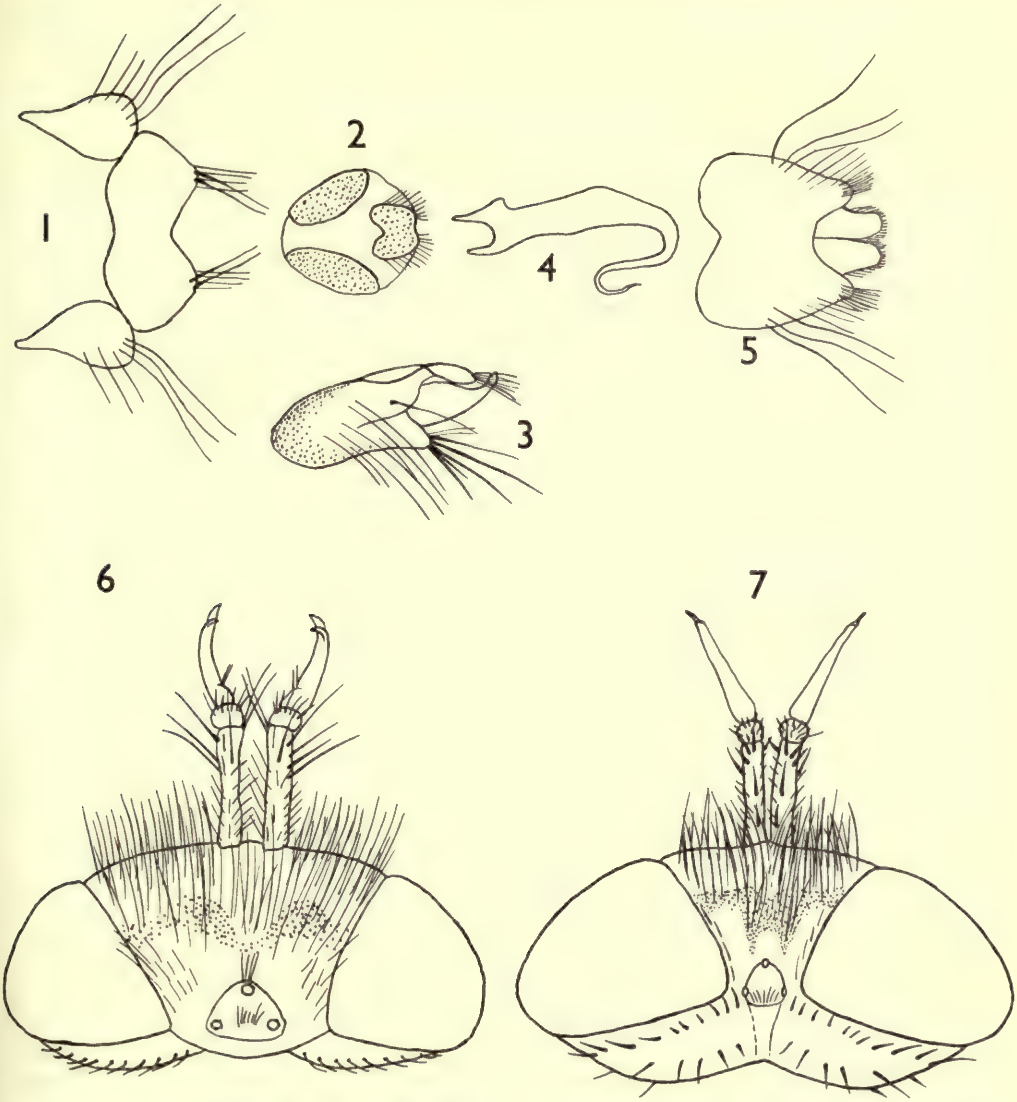
Abdomen shining dark grey-black with lateral and posterior margins of tergites grey dusted ; mixed pale and dark hairs dorsally but only pale hairs laterally and ventrally. Genitalia with lateral lamellae orange, penis S-shaped.

Legs with coxae dark grey and long pale haired, posterior pair with 1 external black bristle. Femora grey with long silvery hairs ; posterior pair with a few black bristles ventrally. Tibiae orange with darkened tips and black bristles. Tarsi mainly black, basitarsi orange in basal half.

Wings clear hyaline with a weak brown stigma, 4th posterior cell closed. Halteres dark.

♀ much more sparsely haired than ♂. Eyes separated over frons which is one-third width of head at its narrowest and widens to almost twice this width just above antennae. Frontal callosities represented by a broad irregular band of darker pigment. Post-ocular fringe shorter than in ♂ and more bristle-like.

Length, 8 mm.



Figs. 1–7. *Thereva* spp., *T. hinu* sp. n. 1–5. ♂ genitalia. 1. sub-apical sternite. 2. apical sternite. 3. lateral lamella. 4. phallobase and aedeagus. 5. apical tergite. 6. ♀ head, dorsal aspect : *T. brunettii* sp. n. 7. ♀ head, dorsal aspect.

Holotype ♂, Nepal : Taplejung Distr., damp evergreen oak forest above Sangu, c. 10,400′, 2–26.xi.1961, resting on stones in clearing (*R. L. Coe*).

Paratypes, 7 ♂, 1 ♀, same data as Holotype.

This species does not seem to be related to the known Oriental species of *Thereva*. Of the Palaearctic species, *innotata* Krober (1912), described from Turkestan, is close but may be distinguished by the orange colour of the 2nd antennal segment and base of the 3rd, and the brown-black thorax bearing 2 yellow-grey, longitudinal stripes.

Thereva brunettii sp. n.

(Text-fig. 7)

♀. Frons about one-sixth width of head at narrowest part and widening to over twice its original width above antennae ; orange-grey dusted with a trapezoid area of dark pigment extending to inner eye margins below ocellar triangle, light and dark haired. Antennae with 1st segment grey, pale haired and with black bristles sub-apically ; 2nd segment and base of 3rd reddish, remainder of 3rd segment grey-black. Face whitish-grey, long pale haired. Proboscis orange-brown. Occiput convex, grey, with upper post-ocular cilia black and ventrally with dense pale hairs ; a few black bristles below post-ocular row.

Thorax dorsally grey-brown with short pale and dark hairs ; no definite longitudinal stripes but 2 vague, brown lines show laterally ; 1–2 pre-sutural, 2 sutural, 2 supra-alar and 1 post-alar bristle. Scutellum concolorous with dorsum, with 4 black marginal bristles and an even covering of shorter pale hairs. Pleurae grey, pale haired.

Abdomen with tergites shining brown-black with yellow dusting on posterior margins, the colour widening laterally ; evenly covered with short golden hairs.

Legs with coxae grey, white haired and with black apical bristles. Femora dark brown-black, white haired, posterior pair with an antero-ventral row of 4–5 short, brown-black bristles sub-apically. Tibiae orange-yellow, brown apically, brown bristled ; anterior pair with 2 antero-dorsal, 2 postero-dorsal, 2 antero-ventral and 2 postero-ventral bristles. Anterior and middle basitarsi orange, following tarsal segments and all posterior tarsal segments brown-black.

Wings pale yellow-brown hyaline, stigma yellow ; 4th posterior cell closed.

♂ unknown.

Length, 10–13 mm.

Holotype ♀, NEPAL : Taplejung Distr., old mixed forest above Sangu, c. 6,200′, 25–28.x.1961 (*R. L. Coe*).

Paratypes 2 ♀, INDIA : Darjeeling, 10.x.1920 and 8.xi.1920, Pres. E. Brunetti.

T. bilineata Brunetti (1920), described from N. India, is close to *brunettii* sp. n. but may be distinguished by the much wider frons, completely dark antennae and 2 clear yellowish white stripes on the dorsum of the thorax.

DOLICHOPODIDAE

To the best of my knowledge only 4 species have previously been recorded from Nepal : *Tachytrechus crassitarsis* de Meijere, 1916, recorded by Becker (1922) ; *Sympycnus gummigutti* Becker, 1922, described from Nepal ; *Diaphorus mandarinus* Wiedemann, 1830, and *Thinophilus indigenus* Becker, 1903. The two latter species were recorded by Ribeiro (1923) in his amendments to the localities in Becker (1922).

None of these species was represented in the British Museum collections which included 27 species and 1 subspecies in 12 genera. The list of species recorded from Nepal now stands as :—

CHRYSOSOMATINAE

Sciopus pediformis Becker, 1922

DOLICHOPODINAE

Dolichopus angustinervis Becker, 1922

Hercostomus ulleriensis sp. n.

H. phollae sp. n.

Tachytrechus crassitarsis de Meijere, 1916

T. compositus sp. n.

HYDROPHORINAE

Thinophilus indigenus Becker, 1903

DIAPHORINAE

Diaphorus mandarinus Wiedemann, 1830
D. jeanae sp. n.
D. sanguensis sp. n.
Chrysotus discretus Becker, 1922
C. pseudocilipes sp. n.
C. kholsa sp. n.
Argyra pseudosuperba sp. n.

RHAPHIINAE

Syntormon dukha sp. n.
S. babu sp. n.
S. ama sp. n.

CAMPSICNEMINAE

Micromorphus albipes (Zetterstedt, 1843)
Sympycnus gummigutti Becker, 1922
S. coei sp. n.
S. arunensis sp. n.
S. albipes nepalensis subsp. n.
S. laetus Becker, 1922
S. khola sp. n.
S. turbidus Becker, 1922
S. peniculitarsus sp. n.
S. gauri sp. n.
S. takagii sp. n.
S. pahar sp. n.
Chrysotimus anomalicerus sp. n.
Nepalomyia dytei gen. and sp. n.
N. confusa sp. n.

This species list cannot be taken as complete as most of the specimens studied were collected from East Nepal in the winter months and very little is known of the summer fauna and that of the more north-westerly region of the country.

As is to be expected the Dolichopodid fauna of Nepal is mainly Oriental with little influence from the Palaearctic region. It is, however, interesting that many species, especially in the Campsicneminae, show relationships with the faunas of Ceylon, Indonesia, Formosa and the Philippines, and the only subspecies described shows a direct link through Ceylon with other islands in the Indian Ocean. The Himalayan Region would therefore seem to be a meeting point for several lines of distribution in the Oriental Region.

The predominance of Campsicneminae in the recorded species may not be a true reflection of the Dolichopodid fauna of Nepal as much of the collecting was carried out in deep gullies with low vegetation.

Key to the Genera known from the Himalayan Region

Those genera in parentheses are not recorded from Nepal.

1 4th long vein forked ; thorax not longer than wide ; vertex sunken on either side of a prominent ocellar triangle ; abdomen long and thin, hypopygium pedunculate . 2
– 4th long vein not forked ; thorax longer than wide ; vertex not deeply sunken between upper eye margins 6
2 In the ♂ no definite joint between arista and 3rd antennal segment thus forming a compound structure which is flattened dorso-ventrally, shiny above and with a triangular patch of short hairs below ; 1st antennal segment with a bulbous projection below . . . . (**Megistostylus** Bigot)
– Arista clearly demarked from 3rd antennal segment or at least not as above . . 3
3 Arista apical . . . . (**Chrysosoma** Guérin)
– Arista dorsal 4
4 4 scutellar bristles ; acrostical bristles at least as strong as dorso-centrals . (**Condylostylus** Bigot, *sensu* Becker)
– 2 scutellar bristles ; acrosticals weaker than dorso-centrals 5
5 3rd antennal segment short triangular, normally not longer than wide **Sciopus** Zeller
– 3rd antennal segment long triangular, almost twice as long as wide (**Megistostylus** Bigot ♀)

6 2nd antennal segment produced thumb-like into 3rd antennal segment on inner surface ; pteropleura often haired . . . . . . **Syntormon** Loew

– 2nd antennal segment transverse or at most produced dorsally over 3rd antennal segment 7

7 1st antennal segment haired on dorsal surface 8

– 1st antennal segment bare on dorsal surface 11

8 Hind coxa with a vertical row of hairs on external surface ; many prothoracic hairs **Argyra** Macquart

– Hind coxa with a single external bristle ; 1 prothoracic bristle 9

9 Hind basitarsus bristled on dorsal surface . . . . . **Dolichopus** Latreille

– Hind basitarsus without bristles on dorsal surface 10

10 Clypeus detached from inner eye margins ; face extending almost to level of lower eye margins ; hind femur with a pre-apico-dorsal row of bristles **Tachytrechus** Walker

– Clypeus not detached from inner eye margins ; face not extending down to level of lower eye margins ; hind femur with external pre-apical bristles . **Hercostomus** Loew

11 Face with a complete transverse division 12

– Face with, at most, an incomplete transverse division 14

12 Thorax with a pre-scutellar flattening ; acrosticals biserial ; arista sub-apical or apical ; hypopygium pedunculate . . . . (**Medetera** Fischer)

– Thorax without a pre-scutellar flattening ; acrosticals uniserial or absent ; arista dorsal ; hypopygium enclosed 13

13 Acrosticals uniserial ; 4 or more scutellar bristles . . . (**Hydrophorus** Fallen)

– Acrosticals absent ; 2 scutellar bristles . . . . . **Thinophilus** Wahlberg

14 Thorax with a strong pre-scutellar flattening ; hypopygium free 15

– Thorax normally without a pre-scutellar flattening ; hypopygium enclosed . . 16

15 Acrosticals biserial ; legs and abdomen relatively long . . **Nepalomyia** gen n.

– Acrosticals absent ; legs and abdomen of normal length . . **Micromorphus** Mik

16 Arista dorsal or sub-apical ; antennae placed near middle of head profile ; occiput concave 17

– Arista dorsal ; antennae placed in upper third of head profile ; occiput convex . 18

17 Wings wider in basal third than in apical third ; frons narrower than face ; ♂ with macrochaetae at tip of abdomen . . . . **Diaphorus** Meigen

– Wings oval ; face narrower than frons ; ♂ abdomen without macrochaetae at tip **Chrysotus** Meigen

18 Bristles of head and thorax pale . . . . **Chrysotimus** Loew

– Bristles of head and thorax black . . . . **Sympycnus** Loew

Chrysosomatinae

Sciopus pediformis Becker

Sciopus pediformis Becker, 1922 : 204, fig. 180.

Described from 1 ♂ from Darjeeling 6–7,000′.

Apart from genitalia differences the ♀ has a wider face than the ♂ ; tibia 1 with a single dorsal bristle in the basal quarter ; tibia 2 with 2 antero-dorsal, 2 postero-dorsal and 1 ventral bristle ; tibia 3 with 1 long antero-dorsal, 5 short postero-dorsal and 2 short ventral bristles.

1 ♂, 1 ♀, NEPAL : Taplejung Distr., between Sangu and Tamrang, c. 5,600′, dense vegetation in tree shade by hill stream, 23.x.1961 (*R. L. Coe*).

Dolichopodinae

Dolichopus angustinervis Becker

Dolichopus angustinervis Becker, 1922 : 9, fig. 2.
Dolichopus angustinervis Becker ; Parent, 1934 : 301.
Dolichopus angustinervis Becker ; Parent, 1941 : 217.

Described from N. India and Formosa and later recorded from Honolulu (Parent 1934) and Nankin, China (Parent 1941).

1 ♀, NEPAL : Katmandu, 4,500′, 20.v.1935 (*F. M. Bailey*) ; 1 ♀, Bakhri Kharka, 5,500′, 24.iv.1954 (*J. Quinlan*) ; 2 ♀, Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

Hercostomus ulleriensis sp. n.

(Text-fig. 8)

♀. Frons one-third width of head, completely grey-brown dusted ; 1 pair of strong orbita bristles. Antennae mainly orange ; 3rd segment darkened at tip, as long as wide and bearing a pubescent arista dorsally. Face as wide as frons, silvery-white and with a convexity above oral margin. Palpi yellow, pale haired. Proboscis orange. Eyes short haired. Occiput grey ; post-ocular cilia black.

Thorax longer than wide ; dorsum metallic green, heavily grey dusted, chaetotaxy normal. Scutellum concolorous with dorsum, with 2 strong marginal bristles, each with a short hair in front, disc bare. Pleurae heavily grey dusted.

Abdomen metallic green, short bristled with longer bristles at posterior margins of tergites.

Legs mainly yellow. Coxae yellow, middle pair with a longitudinal grey stripe externally, dark bristled. Femora yellow, middle and posterior pairs with single pre-apical bristles. Leg 1—tibia yellow with 2 antero-dorsal, 1 postero-dorsal and no ventral bristles ; tarsus yellow-brown. Leg 2—tibia yellow with 4 antero-dorsal, 2 postero-dorsal and 1 ventral bristle ; tarsus brown-black. Leg 3—tibia yellow with 3 antero-dorsal, 4 postero-dorsal and a row of 6–7 short ventral bristles ; basitarsus yellow, following tarsal segments brown-black.

Wings pale brown hyaline ; 3rd and 4th long veins converging in their apical sections ; posterior cross-vein shorter than apical section of 5th vein. Squamae yellow, cilia black. Halteres yellow.

Length 4 mm.

♂ unknown.

Holotype ♀, NEPAL : 2 miles S.W. of Ulleri, 6–7,000′, 18.v.1954 (*J. Quinlan*).

Of the Oriental species of *Hercostomus, lucidiventris* Becker, 1922, described from Formosa, is close but may be distinguished by its completely black antennae and yellow side-spots on the 1st three abdominal segments.

In keys to Palaearctic species *ulleriensis* sp. n. will run to *novus* Parent, 1927, described from China, but this species has an almost bare arista, mid and hind coxae are dark, fore-tibia has a ventral bristle and the posterior cross-vein is longer than the apical section of the 5th vein.

Hercostomus phollae sp. n.

(Text-figs. 9, 10)

♂. Frons less than one-third width of head, completely brown dusted ; orbital bristles weaker than inter-ocellars. Antennae orange-brown ; 3rd segment black in apical half, as long as wide and bearing a micro-pubescent arista dorsally. Face half width of frons, brown dusted. Palpi black. Proboscis brown. Occiput grey, post-ocular cilia completely black.

Dorsum of thorax metallic green, heavily grey dusted, chaetotaxy normal. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae grey dusted.

Abdomen metallic green with strong patches of grey dusting laterally. Hypopygium large, black ; external lamellae small, black, subtriangular.

Legs mainly yellow. Coxae grey with yellow tips and black bristles. Femora yellow, hind pair with 4–5 pre-apical bristles. Leg 1—tibia yellow with 1 antero-dorsal, 2 postero-dorsal and no ventral bristles ; tarsus yellow-brown. Leg 2—tibiae missing from type. Leg 3—tibia yellow with 2 antero-dorsal, 4 postero-dorsal and no ventral bristles ; basitarsus yellow, following tarsal segments dark.

Wings clear hyaline ; 3rd and 4th long veins slightly convergent in their apical sections ; posterior cross-vein shorter than apical section of 5th vein. Cilia of squamae black. Halteres yellow.

♀ similar to ♂, tibia 2 with 3 antero-dorsal, 2 postero-dorsal and 1 ventral bristle.

Length 3 mm.

Holotype ♂, Nepal : Taplejung Distr., above Sangu, c. 6,500′, evergreen scrub, 5–13.x.1961 (*R. L. Coe*).

Paratypes 2 ♀, Dobhan, c. 3,500′, shady places on shrubby slope above R. Tamur, 21–27.i.1962 (*R. L. Coe*).

H. compositus Becker, 1922, described from Satara District, 4,200′, appears close to *phollae* sp. n. but has antennal segments 1 and 2 black, face and frons black and yellow fore-coxae.

Hercostomus kaulbacki **sp. n.**

(Text-figs. 11, 12)

♂. Frons metallic green, grey dusted ; orbital bristles much weaker than inter-ocellars. Face less than half width of frons, silvery white. Antennae completely black ; 3rd segment rounded at apex, as long as wide and bearing a micropubescent arista dorsally. Palpi black, grey dusted ; proboscis black. Post-ocular cilia black dorsally, pale laterally and ventrally.

Thorax twice as long as wide ; dorsum metallic green, yellow-grey dusted and with a median longitudinal brown stripe ; acrostical bristles totally absent, other bristles much more hair-like than normal. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae metallic green, grey dusted.

Abdomen metallic green, evenly short, dark bristled. Hypopygium large, black ; external lamellae large, yellow with a darkened rim and bearing black bristles ; penis long, barbed in apical third.

Legs with coxae grey-brown, dark bristled, yellow at tips. Femora dark yellow, mid and hind pairs with single pre-apical bristles. Leg 1—tibia yellow with 1 antero-dorsal, 2 postero-dorsal and 1 antero-ventral bristle; basitarsus yellow, darkened at tip, following tarsal segments brown. Leg 2—tibia yellow with 4 antero-dorsal, 2 postero-dorsal and no ventral bristles ; tarsus brown. Leg 3—tibia yellow, brown in apical fifth, with 3 antero-dorsal, 3 postero-dorsal and 2 short ventral bristles ; tarsus black.

Wings pale brown hyaline ; anal lobe not developed ; costa thickened between endings of 1st and 2nd long veins ; 2nd long vein thickened in its basal two-thirds ; 3rd and 4th long veins slightly convergent in their apical sections ; apical section of 5th long vein twice as long as posterior cross-vein. Squamae and cilia pale. Halteres yellow.

♀ unknown.

Length 4·5 mm.

Holotype ♂, S.E. TIBET : Rong Tō Valley, 21.v.1933, 6,500′ (*F. Kingdon-Ward & R. J. H. Kaulback*).

This species is not related to the Oriental fauna but in the Palaearctic region *crassivena* Stackelberg, 1934, described from China, is close but has both 2nd and 3rd long veins thickened basally, biserial acrosticals and the middle tibia has a ventral bristle.

KEY TO HIMALAYAN *Hercostomus*

1 Antennae completely black 2

– Antennae mainly yellow 3

2 Fore-coxae yellow ; acrosticals present and biserial ; in ♂ 2nd vein simple **caecus** Becker

– Fore-coxae grey ; acrosticals absent ; in ♂ 2nd long vein thickened in its basal two-thirds . . . . **kaulbacki** sp. n.

3 All coxae grey ; 4–5 pre-apical bristles on hind femur ; 3rd and 4th long veins slightly convergent ; in ♀ face narrow, brown . . . . . . **phollae** sp. n.

– All coxae yellow ; 1 pre-apical bristle on hind femur ; 3rd and 4th long veins strongly convergent ; in ♀ face wide, white . . . . . **ulleriensis** sp. n.

Tachytrechus crassitarsis de Meijere

(Text-figs. 13, 14)

Tachytrechus crassitarsis de Meijere, 1916 : 237.
Tachytrechus crassitarsis de Meijere ; Becker, 1922 : 32.

Described from 1 ♂ and 1 ♀ from Java and recorded from Nepal (Becker, 1922).

The types have been examined and de Meijere's description is adequate. Figures are given of the ♂ fore-tarsus, penis sheath and ventral lobe.

***Tachytrechus compositus* sp. n.**

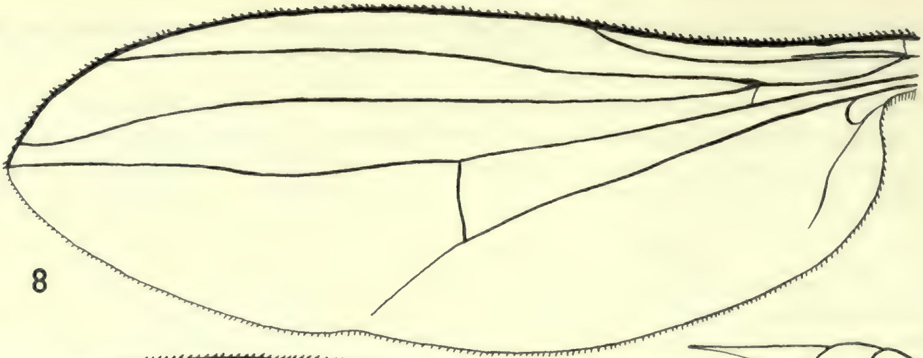
(Text-fig. 15)

♂. Frons one-third width of head, metallic green, grey-brown dusted. Antennae mainly black, 1st segment orange apico-ventrally ; 3rd segment rounded, with dorsal arista. Face metallic green, yellow-grey dusted, half width of frons just below antennae and widening to one and a half times its original width at clypeus, latter separated from inner eye margins and extending almost to level of lower eye margins. Palpi and proboscis black. Post-ocular cilia black above, pale laterally and ventrally.

Dorsum of thorax dark metallic green, grey dusted, darker at bases of bristles ; chaetotaxy normal. Pleurae metallic green, grey dusted.

Abdomen metallic green, heavily grey dusted laterally ; short, black bristled but posterior margins of tergites bear longer bristles. Hypopygium black ; external lamellae black, sub-triangular ; penis sheath serrate laterally.

Legs with coxae green-grey, dark bristled. Femora green-grey, fore- and middle pairs yellow in apical quarter, posterior pair with a sub-apico-dorsal row of 4–5 bristles. Leg 1—tibia yellow, black apically, with 3 antero-dorsal, 2 postero-dorsal and no ventral bristles ; basitarsus yellow, black in apical third, following tarsal segments black, longer than wide and not flattened. Leg 2—tibia yellow, black apically, with 5 antero-dorsal, 3 postero-dorsal and 1 ventral bristle ; tarsal segments 1–4 each with 1 long and 1 short apico-ventral bristle, basitarsus yellow basally and black in the apical third, following tarsal segments dark. Leg 3—tibia yellow, black



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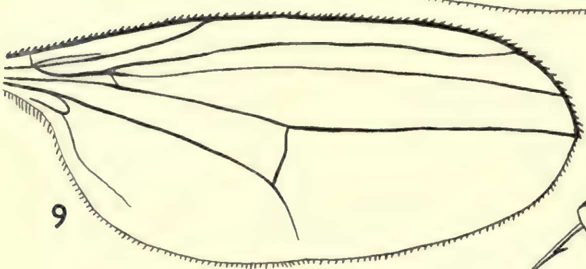

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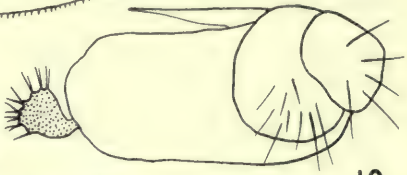

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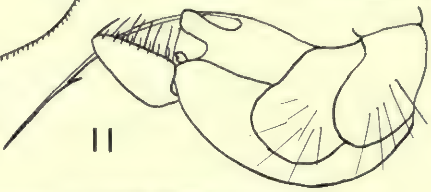

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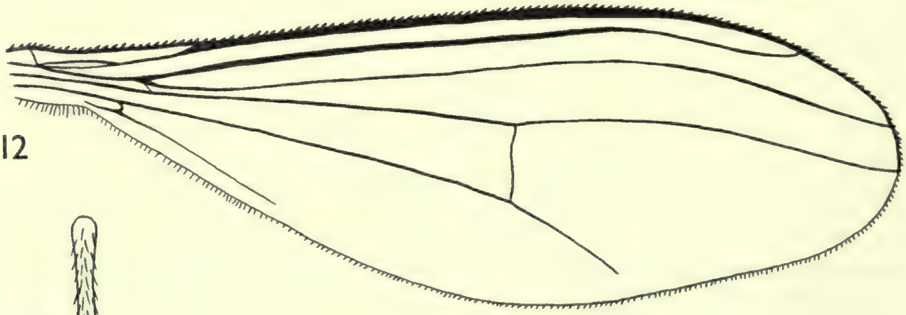

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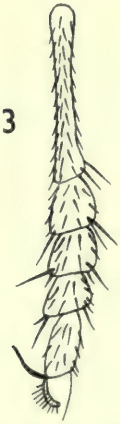

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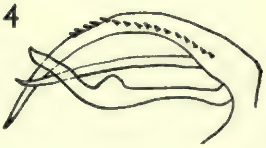

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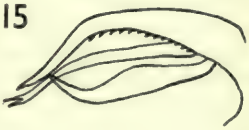


15

Figs. 8–15. *Hercostomus ulleriensis* sp. n. 8. ♀ wing : *H. phollae* sp. n. 9. ♂ wing. 10. ♂ hypopygium : *H. kaulbacki* sp. n. 11. ♂ hypopygium. 12. ♂ wing : *Tachytrechus crassitarsis* de Meijere. 13. ♂ fore-tarsus. 14. ♂ penis sheath and ventral lobe : *T. compositus* sp. n. 15. ♂ penis sheath and ventral lobe.

apically, with 6 antero-dorsal, 5 postero-dorsal and a row of 5–6 short ventral bristles ; basitarsus black but yellow in externo-basal half, following tarsal segments black, segments 1–4 each with 1 long and 1 short apico-ventral bristle.

Wings clear hyaline, costa thickened between *h* and R_1 ; 3rd and 4th long veins convergent apically ; posterior cross-vein convex to posterior wing margin and of equal length to apical section of 5th vein. Squamae pale, cilia dark. Halteres orange.

♀ similar to ♂ but with shorter 1st antennal segment ; tibia 1 with 3 antero-dorsal, 2 postero-dorsal and 2 postero-ventral bristles ; tibia 2 with 3 antero-dorsal, 4 postero-dorsal, 1 antero-ventral and 2 postero-ventral bristles.

Length 5 mm.

Holotype ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, yellow blooms of cultivated Compositae, 16–29.x.1961 (*R. L. Coe*).

Paratypes 2 ♀, same data as Holotype.

Compositus sp. n. may be separated from the other species of *Tachytrechus* in the Oriental region by the following key :—

1 Femora mainly yellow 2
– Femora mainly dark 3
2 Antennal segments 1 and 2 yellow . . . . ***picticornis*** Bigot
– Antennae completely black ; wing darkened apically between 2nd and 3rd long veins ***argentatus*** de Meijere
3 Tibia 2 with more than 4 ventral bristles 4
– Tibia 2 with, at most, 3 ventral bristles 5
4 Tibiae brown-black, fore-tarsus of ♂ simple . . . . . ***genualis*** Loew
– Tibiae mainly yellow, last 4 segments of ♂ fore-tarsus flattened laterally ***indicus*** Parent
5 Hind basitarsus yellow in basal half on external surface ; tibia 2 with at most 3 ventral bristles ; in ♂ fore-tarsus not flattened laterally . . ***compositus*** sp. n.
– Hind basitarsus completely black ; tibia 2 without ventral bristles ; in ♂ segments 2–4 of fore-tarsus flattened laterally . . . . . ***crassitarsis*** de Meijere

Hydrophorinae

Thinophilus indigenus Becker

Thinophilus indigenus Becker, 1903 : 73.
Thinophilus indigenus Becker ; Becker, 1922 : 37, fig. 27.
Thinophilus indigenus Becker ; Ribeiro, 1923 : 336.
Thinophilus indigenus Becker ; Frey, 1925 : 24.
Thinophilus indigenus Becker ; Parent, 1934 : 306.
Thinophilus indigenus Becker ; Parent, 1935 : 210 and 528.
Thinophilus indigenus Becker ; Vaillant, 1953 : 3, figs. 1–9.

This widely distributed species was described from Egypt (Becker, 1903) and recorded from Formosa (Becker, 1922), Nepal (Ribeiro, 1923), Philippines (Frey, 1925), India (Parent, 1934), Malay Peninsula and N. Borneo (Parent, 1935) and Algeria (Vaillant, 1953).

Rhaphiinae

***Syntormon dukha* sp. n.**

(Text-figs. 16–18)

♂. Frons wide, shining blue-violet. Antennae completely black ; 1st segment with 1–2 bristles dorsally ; 2nd segment haired above and produced thumb-like into inner surface of

3rd segment, being completely covered by 3rd segment ventrally but only in its apical half dorsally ; 3rd segment slightly less than three times as long as wide and bearing an arista subapically which is as long as 3rd segment. Face narrow, silver pruinose. Palpi black, silver pollinose ; proboscis black. Post-ocular cilia uniserial and dark above, multiserial and pale below.

Dorsum of thorax shining metallic green, brown dusted ; acrostical bristles uniserial, 6 pairs of dorso-centrals, prothoracic hairs pale. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae grey dusted, pteropleura bearing a tuft of long, pale hairs.

Abdomen long, metallic green, tergite 1 with post-marginal row of very long, black bristles. Hypopygium enclosed.

Legs with coxa 1 yellow, pale haired and with black apical bristles ; coxae 2 and 3 dark, latter with a single external bristle. Femora yellow, posterior pair brown apically, each with a dark externo-ventral streak along its entire length. Leg 1—tibia yellow with a weak antero-dorsal bristle in basal third and 2 weak postero-dorsal bristles in apical third ; basitarsus yellow in basal third, remainder black, following tarsal segments black, basitarsus as long as segments 2–4 together. Leg 2—tibia yellow with 3 antero-dorsal, 2 postero-dorsal and 3 ventral bristles ; basitarsus yellow, black in apical fifth, following tarsal segments dark. Leg 3—tibia yellow but darkening to black in apical third, with 5 postero-dorsal bristles and an antero-dorsal fringe of bristles in apical two-thirds which become longer towards apex ; tarsus black, basitarsus slightly shorter than following segment and bearing an unequally bifid black spine in ventral third.

Wings pale brown hyaline ; 2nd and 3rd veins divergent, 3rd and 4th veins convergent ; posterior cross-vein longer than apical section of 5th vein. Squamae and cilia pale. Halteres yellow.

♀ similar to ♂ but with short 3rd antennal segment ; wide face which is convex below ; tibia 2 with 5 antero-dorsal, 2 postero-dorsal and 3 antero-ventral bristles ; posterior femora without externo-ventral brown streak ; posterior tibia completely yellow and without antero-dorsal fringe of bristles ; simple hind basitarsus.

Length 4·5 mm.

Holotype ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, yellow blooms of cultivated Compositae, 16–29.x.1961 (*R. L. Coe*).

Paratypes 2 ♀, mixed vegetation by stream in gully, xi.1961–i.1962 (*R. L. Coe*).

S. dukha sp. n. is probably not related to the known Oriental species of *Syntormon*. Of the Palaearctic species *pallipes* (Fabricius) is close but may be differentiated by its apical arista, equally bifid spine on hind basitarsus, and more complete dorsal row of longer bristles on hind tibia.

***Syntormon babu* sp. n.**

(Text-figs. 19, 20)

♂. Frons wide, shining metallic blue-violet. Antennae completely black ; 1st segment bare above ; 2nd segment haired above and produced thumb-like into inner surface of 3rd segment; latter not quite three times as long as wide and bearing an arista sub-apically which is not as long as 3rd antennal segment. Face narrow, silver pruinose. Palpi and proboscis black. Eyes short pale haired. Post ocular cilia black and uniserial above, pale and multiserial below.

Dorsum of thorax shining metallic green, brown dusted ; acrostical bristles microscopic, uniserial ; 6 pairs of dorso-centrals. Pleurae grey dusted, pteropleura weakly pale haired. Scutellum concolorous with dorsum with 2 marginal bristles.

Abdomen long, metallic green. Hypopygium enclosed.

Legs with anterior coxae yellow, pale haired and with black apical bristles ; mid and posterior coxae dark with pale tips, posterior pair with a single external black bristle. Femora completely yellow. Leg 1—tibia yellow with 1 weak dorsal bristle medially ; basitarsus yellow and as long as segments 2 and 3 together, segments 2–5 brown. Leg 2—tibia yellow with 3 antero-dorsal, 1 postero-dorsal and 2 antero-ventral bristles ; basitarsus yellow but darkening apically, following tarsal segments dark. Leg 3—tibia yellow with a weak antero-dorsal fringe of bristles in apical half, and 3 strong postero-dorsal bristles ; basitarsus brown, shorter than following segment and with a simple curved spine ventro-medially, following tarsal segments black.

Wings very pale brown hyaline ; 2nd and 3rd long veins divergent, 3rd and 4th long veins convergent ; posterior cross-vein shorter than apical section of 5th vein ; anal vein weak. Squamae and cilia pale. Halteres yellow.

♀ unknown.

Length 3·5 mm.

Holotype ♂, NEPAL : Taplejung Distr., between Sangu and Tamrang, mixed plants by damp cliff in deep river gorge, c. 5,200′, i–ii.1962 (*R. L. Coe*).

This species is related to *dukha* sp. n. from which it may be easily distinguished by the simple spine on the hind basitarsus and the more enclosed 2nd antennal segment.

Syntormon ama sp. n.

(Text-figs. 21, 22)

♂. Frons wide, shining metallic blue-green. Antennae completely black, 1st segment bare above (?), 2nd segment haired above and produced thumb-like into inner surface of 3rd segment, latter flask shaped and two and a half times as long as wide, arista apical and half as long as 3rd antennal segment. Face narrow, silver pruinose. Palpi and proboscis black. Eyes short pale haired. Post-ocular cilia uniserial and black above, pale and multiserial below.

Dorsum of thorax shining metallic green with longitudinal brown stripes in regions of acrostical and dorso-central bristles ; acrosticals biserial, 6 pairs of dorso-centrals, prothoracic hairs pale. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae grey dusted, pteropleura weakly pale haired.

Abdomen dark metallic green ; hypopygium enclosed.

Legs with anterior coxae pale, dark at base, with pale hairs and black apical bristles ; mid and hind coxae dark, pale at tips, hind pair with a black bristle externally. Femora yellow, hind pair darkened apically. Leg 1—tibia yellow, with 1 dorsal bristle in basal third ; tarsus brown, basitarsus as long as segments 2–4 together. Leg 2—tibia yellow, with 3 antero-dorsal, 1 postero-dorsal and no ventral bristles ; basitarsus black apically but mainly yellow, following tarsal segments dark. Leg 3—tibia yellow, brown-black apically, with 3 antero-dorsal, 4 postero-dorsal and a row of short ventral bristles ; tarsus black, basitarsus simple, shorter than following tarsal segment.

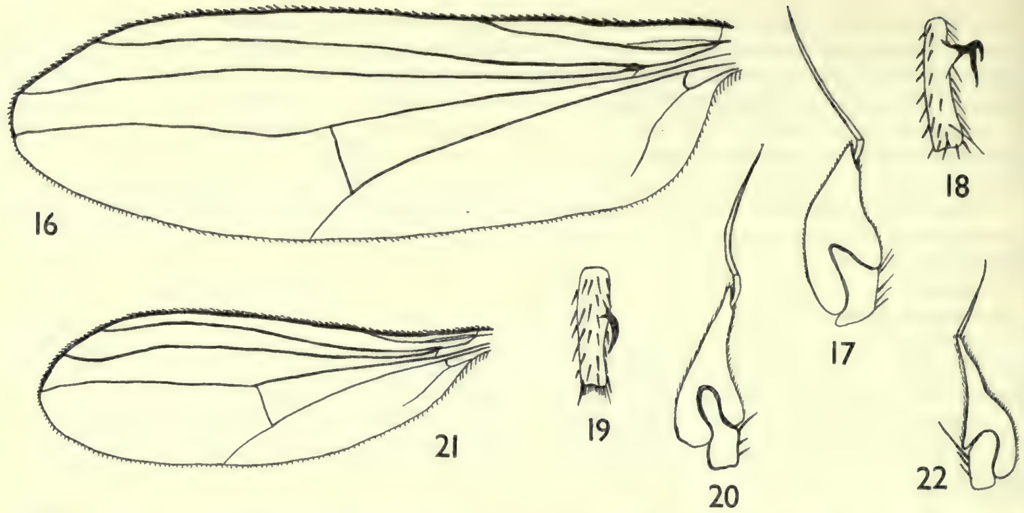
Wings clear hyaline ; 2nd and 3rd veins divergent, 3rd and 4th veins convergent, posterior cross-vein shorter than apical section of 5th vein, anal vein weak. Squamae pale, cilia brown. Halteres yellow.

♀ unknown.

Length 2·5 mm.

Holotype ♂, NEPAL : Taplejung Distr., Dobhan, c. 3,500′, shady places on shrubby slope above R. Tamur, 21–27.i.1962 (*R. L. Coe*).

S. frivolus Becker, 1922, is related to *ama* sp. n. but differs in that the acrostical bristles are uniserial and the hind femora are completely yellow.



FIGS. 16–22. *Syntormon* spp., *S. dukha* sp. n. 16. ♂ wing. 17. ♂ 2nd and 3rd antennal segments. 18. ♂ hind basitarsus : *S. babu* sp. n. 19. ♂ hind basitarsus. 20. ♂ 2nd and 3rd antennal segments : *S. ama* sp. n. 21. ♂ wing. 22. ♂ 2nd and 3rd antennal segments.

KEY TO NEPALESE SPECIES OF *Syntormon*

1 Acrostical bristles completely biserial ; arista apical ; in ♂ hind basitarsus simple, posterior cross-vein shorter than apical section of 5th vein . . . . . ***ama*** sp. n.
– Acrostical bristles irregularly uniserial, arista sub-apical ; in ♂ hind basitarsus with a spine ventrally 2
2 Hind basitarsal spine of ♂ bifid ; 3rd antennal segment not extending down dorsal surface of pedicel ; posterior cross-vein longer than apical section of 5th vein ***dukha*** sp. n.
– Hind basitarsal spine of ♂ simple ; 3rd antennal segment extended for some length over dorsal surface of pedicel ; posterior cross-vein shorter than apical section of 5th vein . . . . ***babu*** sp. n.

Diaphorinae

Diaphorus jeanae sp. n.

(Text-fig. 23)

♂. Frons metallic green, heavily yellow dusted, less than one-eighth width of head but hardly narrower than face ; orbital bristles not developed, interocellars strong. Antennae in centre of head profile ; 1st segment yellow, bare above ; 2nd segment black with an apical crown of short bristles ; 3rd segment black, triangular, hardly longer than wide and bearing a pubescent arista sub-apically. Face grey. Palpi yellow with black bristles, proboscis brown. Eyes widely separated over frons, short pale haired. Occiput grey, post-vertical bristles developed but in same series as post-ocular cilia ; latter black and uniserial above, pale and multiserial below.

Dorsum of thorax metallic green, heavily yellow-grey dusted ; acrostical bristles biserial, 5 pairs of dorso-centrals, rest of chaetotaxy complete. Scutellum slightly darker than dorsum with 2 strong marginal bristles each with a hair-like bristle in front. Pleurae metallic green, grey dusted.

Abdomen with segments 1–3 mainly yellow, segments 4–5 and hypopygium metallic green ; 2 strong macrochaetae present at tip of abdomen. Lamellae strap-like, not as long as abdomen is deep, yellow with black hairs.

Legs with coxa 1 yellow with black bristles ; coxa 2 grey, black bristled ; coxa 3 yellow with a single black bristle externally. Femora yellow with double ventral fringes of black bristles which are slightly shorter than the femur is wide. Leg 1—tibia yellow without strong bristles ; basitarsus yellow and as long as following tarsal segments together, segment 5 with long hairs dorsally, pulvilli large. Leg 2—tibia yellow with 2 antero-dorsal, 1 postero-dorsal and 1 ventral bristle ; basitarsus yellow, following tarsal segments brown, pulvilli large. Leg 3—tibia yellow with 3 dorsal bristles ; tarsus brown, basitarsus slightly longer than following tarsal segment, pulvilli small.

Wings clear hyaline ; 2nd vein sinuous, 3rd and 4th veins parallel in their apical sections, posterior cross-vein shorter than apical section of 5th vein. Squamae yellow, cilia dark. Halteres yellow.

♀. Unknown.

Length 4 mm.

Holotype ♂, NEPAL : Bakhri Kharka, 5,500′, 24.iv.1954 (*J. Quinlan*).

D. mandarinus Wiedemann, the only species of *Diaphorus* previously recorded from Nepal, is closely related to *jeanae* sp. n. but may be distinguished by its mainly yellow antennae, the much narrower face in the ♂ and the shorter genital lamellae.

***Diaphorus sanguensis* sp. n.**

♀. Frons metallic green, grey dusted, one-third width of head ; orbital and interocellar bristles well developed. Antennae in middle of head profile ; 1st segment bare above, mainly black but with orange-yellow coloration on inner ventral aspect ; 2nd segment black with an apical crown of short bristles ; 3rd segment black, wider than long and bearing a pubescent arista sub-apically. Face as wide as frons, heavily grey dusted. Palpi yellow with black bristles, proboscis black. Occiput grey ; post-ocular cilia black and uniserial above, pale and multiserial below.

Dorsum of thorax shining metallic green, grey dusted ; acrostical bristles biserial, 5 pairs of dorso-centrals. Scutellum concolorous with dorsum with 2 strong marginal bristles each with a short hair in front. Pleurae metallic green, grey dusted.

Abdomen with segment 1 completely yellow, 2nd segment yellow ventrally and in anterior half laterally but green dorsally in the mid line, following segments metallic green.

Legs with coxa 1 yellow, black bristled ; coxa 2 grey, black bristled ; coxa 3 yellow with a single black bristle externally. Femora yellow, without ventral fringes of hairs or bristles. Leg 1—tibia yellow with 1 antero-dorsal, 2 postero-dorsal and no ventral bristles ; basitarsus yellow, following tarsal segments darker. Leg 2—tibia yellow, with 3 antero-dorsal, 3 postero-dorsal and 3 ventral bristles ; basitarsus yellow, following tarsal segments brown. Leg 3—tibia yellow, with 2 antero-dorsal, 4 postero-dorsal and a row of short ventral bristles ; basitarsus yellow and slightly longer than 2nd tarsal segment, following tarsal segments brown.

Wings clear hyaline ; 2nd vein slightly sinuous, 3rd and 4th veins parallel apically, posterior cross-vein shorter than apical section of 5th vein. Squamae pale, cilia dark. Halteres yellow.

♂. Unknown.

Length 4 mm.

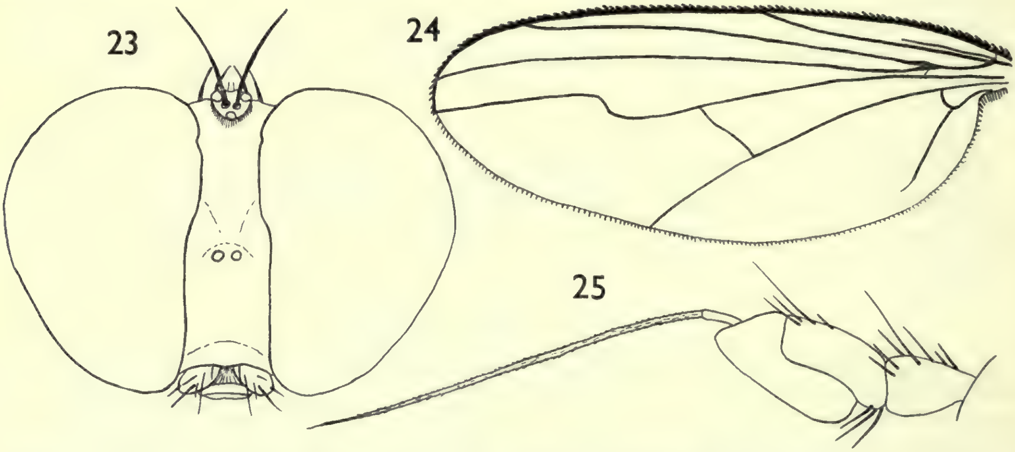
Holotype ♀, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

D. sanguensis sp. n. may be separated from the other known species of *Diaphorus* in the Oriental Region by the colour combination of antennae, abdomen and legs.

Diaphorus mandarinus Wiedemann

Diaphorus mandarinus Wiedemann, 1830 : 212.
Diaphorus mandarinus Wiedemann ; Becker, 1922 : 78.
Diaphorus mandarinus Wiedemann ; Ribeiro, 1923 : 339.
Diaphorus mandarinus Wiedemann ; Frey, 1925 : 23.
Diaphorus mandarinus Wiedemann ; Parent, 1934 : 301.

A widely distributed species originally described from China (Wiedemann, 1830) and later recorded from Formosa and India (Becker, 1922), Nepal (Ribeiro, 1923), the Philippines (Frey, 1925) and Central Borneo (Parent, 1934).



FIGS. 23–25. *Diaphorus jeanae* sp. n. 23. ♂ head, from front : *Argyra pseudosuperba* sp. n. 24. ♀ wing. 25. ♀ antenna.

KEY TO HIMALAYAN SPECIES OF *Diaphorus*

1 Antennae completely black ; abdomen without yellow coloration ; all coxae dark **hirsutipes** Becker
– Antennae partly yellow ; abdomen with yellow coloration ; fore- and hind-coxae yellow 2
2 First antennal segment completely yellow ; 3rd abdominal segment yellow . . 3
– First antennal segment black above ; 3rd abdominal segment metallic green **sanguensis** sp. n.
3 2nd and 3rd antennal segments black ; in ♂ frons hardly narrower than face **jeanae** sp. n.
– 2nd antennal segment yellow, 3rd brown ; in ♂ frons at most one-third width of face **mandarinus** Wiedemann

Chrysotus discretus Becker

Chrysotus discretus Becker, 1922 : 89.

Described from various localities in the Indian Himalayas.

3 ♂, 2 ♀, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 ; 2 ♂, 3 ♀, xi.1961–i.1962 ; 5 ♂, 2 ♀, yellow blooms of cultivated

Compositae, 16–29.x.1961 ; 1 ♂, 1 ♀, rotting fruits of Bhor tree on ground, 7–31.x. 1961 ; 4 ♂, 1 ♀, above Sangu, c. 6,500′, evergreen shrubs, 5–13.x.1961 ; 1 ♂, 1 ♀, edge of mixed forest above Sangu, c. 6,500′, 17.x.–1.xi.1961 ; 3 ♂, between Sangu and Tamrang, deep river gorge, c. 5,200′, x–xi.1961 ; 2 ♂, shrubs by path, c. 5,800′, 6.xi.1961 ; 1 ♂, river banks below Tamrang bridge, c. 5,500′, x–xi.1961 ; 1 ♀, Arun Valley, above R. Sabhaya, east shore, swept from dwarf bamboos in deep ravine, c. 2,000′, 12.xii.1961 (*R. L. Coe*) ; 2 ♀, Bahkri Kharka, 5,500′, 24.iv.1954 ; 1 ♂, 2 miles S.W. of Rambrong, 8,000′, 26.iv.1954 ; 1 ♂, 5 ♀, 2 miles S.W. of Ulleri, 6–7,000′, 18.v.1954 ; 2 ♀, S.E. Sikha, 7–8,000′, 23.v.1954 (*J. Quinlan*).

Chrysotus pseudocilipes sp. n.

♂. Frons shining metallic green, coarsely pitted. Antennae completely black ; 3rd segment wider than long, subreniform with pointed tip and bearing a pubescent arista sub-apically. Eyes short pale haired, contiguous over face. Palpi yellow, proboscis black. Post-ocular cilia black above, pale laterally and ventrally.

Dorsum of thorax shining metallic green with reddish tinges ; chaetotaxy normal. Scutellum concolorous with dorsum with 2 strong marginal bristles.

Abdomen metallic green, evenly short bristled. Hypopygium enclosed.

Legs with anterior coxae yellow, dark at base, dark bristled ; mid and hind coxae dark with pale tips, hind pair with a long, black bristle externally. Femora yellow, posterior pair dark in apical quarter and with 2–3 long bristles apico-ventrally. Leg 1—tibia yellow with a single dorsal bristle in basal third ; basitarsus yellow, almost as long as following tarsal segments together, these latter segments brown. Leg 2—tibia yellow with 2 long antero-dorsal, 2 shorter postero-dorsal and no ventral bristles ; tarsus darkening towards tip. Leg 3—tibia yellow, darkened in apical quarter and with an irregular short ciliation on external surface ; tarsus brown, basitarsus slightly longer than following tarsal segment and with a short ciliation on external surface.

Wings pale brown hyaline ; 3rd and 4th long veins slightly divergent ; apical section of 5th vein 4·4 times as long as posterior cross-vein. Squamae and cilia pale. Halteres pale.

♀. Similar to ♂ but eyes widely separated over face which is heavily grey dusted.

Length 2 mm.

Holotype ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, yellow blooms of cultivated Compositae, 16–29.x.1961 (*R. L. Coe*).

Paratypes 2 ♂, 1 ♀, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

This species is closely related to *cilipes* Meigen, 1824, differing in the irregular ciliation of the hind tibia and tarsus, and the absence of a ventral row of bristles in apical third of hind tibia.

Chrysotus kholsa sp. n.

♂. Frons shining metallic green, coarsely pitted. Antennae completely black ; 3rd segment reniform and bearing a pubescent arista dorsally. Eyes short pale haired, contiguous over face. Palpi yellow, proboscis dark. Post-ocular cilia black above, pale laterally and ventrally.

Dorsum of thorax shining metallic green, chaetotaxy complete.

Abdomen metallic green, evenly short bristled. Hypopygium enclosed.

Legs with coxae dark, pale at tips, dark bristled. Fore and mid femora broadly brown medially, posterior femora dark in apical quarter. Leg 1—tibia yellow with a single weak dorsal bristle in basal third ; basitarsus yellow, following tarsal segments dark. Leg 2—tibia yellow with 2 antero-dorsal, 2 postero-dorsal and no ventral bristles ; basitarsus yellow, following tarsal segments dark. Leg 3—tibia yellow-brown, darker apically, with 3 dorsal bristles and a regular, short ciliation on external surface ; tarsus brown.

Wings clear hyaline ; 3rd and 4th veins parallel, posterior cross-vein one-third length of apical section of 5th vein. Squamae pale, cilia dark. Halteres pale.

♀. Similar to ♂ but eyes widely separated over face which is metallic green and grey dusted.

Length 2·5 mm.

Holotype ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

Paratypes 4 ♀, same data as Holotype ; 1 ♀, xi.1961–i.1962 ; 1 ♀, yellow blooms of cultivated Compositae, 16–29.x.1961 (*R. L. Coe*).

C. kholsa sp. n. is similar to the previous species from which it may be readily distinguished by the leg coloration, the shape of the 3rd antennal segment and the chaetotaxy of the hind tibia.

KEY TO NEPALESE SPECIES OF *Chrysotus*

1 Post-ocular cilia completely black ; femora almost completely dark, only extreme tips pale . . . . ***discretus*** Becker

– Post-ocular cilia pale laterally and ventrally ; anterior and middle femora, at most, darkened medially 2

2 Fore-coxae mainly pale ; anterior and middle femora completely pale, posterior pair darkened in apical quarter . . . . ***pseudocilipes*** sp. n.

– Fore-coxae mainly dark ; femora broadly dark medially . . . ***kholsa*** sp. n.

Argyra pseudosuperba **sp. n.**

(Text-figs. 24, 25)

♀. Frons a quarter width of head, metallic blue-violet with grey dusting at edges ; paired orbital and interocellar bristles well developed. Antennae completely black ; 1st segment short, haired dorsally ; 2nd segment extended more than halfway over dorsal and dorso-lateral surfaces of 3rd antennal segment ; latter triangular, longer than wide and bearing a microscopically pubescent arista dorsally which is at least 1·8 times as long as 3rd antennal segment. Face as wide as frons, parallel sided, silver pruinose. Palpi and proboscis black. Eyes densely short pale haired. Occiput metallic green, silver dusted. Post-ocular cilia black and uniserial above, pale and multiserial laterally and ventrally.

Dorsum of thorax metallic green, heavily silver dusted ; acrostical bristles quadriserial, 6 pairs of dorso-centrals, whole disc with supplementary hairs. Scutellum concolorous with dorsum with 4 marginal bristles and supplementary hairs on disc. Pleurae heavily grey dusted.

Abdomen metallic green with tergites silver dusted at their bases laterally; densely short bristled, posterior margins of tergites with longer bristles.

Legs with coxa 1 yellow, silver dusted and black bristled ; middle and posterior coxae dark, posterior pair with an externo-vertical row of dark hairs. Femora yellow, evenly covered with moderately long hairs, middle and posterior pairs with single pre-apical bristles. Leg 1—tibia yellow with 4–5 antero-dorsal, 3 posterior dorsal and no ventral bristles ; basitarsus yellow, longer than following tarsal segments together, these being brown. Leg 2—tibia yellow with 3 antero-dorsal, 2 postero-dorsal and 3–4 short ventral bristles ; basitarsus yellow, longer than following tarsal segments together, these being brown. Leg 3—tibia yellow, brown at extreme tip, with 4 long antero-dorsal, 4 long postero-dorsal and no long ventral bristles, the whole segment being covered with short hair-like bristles ; tarsus black, basitarsus as long as 2nd tarsal segment.

Wings broad, pale brown hyaline ; 2nd and 3rd veins divergent, 3rd and 4th veins parallel apically, 4th vein with a strong Z-bend in apical section, posterior cross-vein sinuous and shorter than apical section of 5th vein, anal vein almost reaching to wing margin. Squamae yellow with dark tips and black cilia. Halteres orange.

♂. Unknown.

Length 6·5 mm.

Holotype ♀, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

Paratype ♀, INDIA : pres. E. Brunetti.

A. superba Tagaki, 1960, described from Japan, is very close to *pseudosuperba* sp. n., differing in that the frons is more heavily silver dusted, the squamal cilia are pale, wing veins 2 and 3 are more divergent, the 4th wing vein has a less accentuated Z-bend, the arista is shorter in relation to the 3rd antennal segment and the chaetotaxy of the legs is different.

Campsicneminae

Micromorphus albipes (Zetterstedt)

Hydrophorus albipes Zetterstedt, 1843 : 454.
Medeterus albipes (Zetterstedt) Raddatz, 1873 : 330.
Thrypticus bellus Strobl, 1880 : 59.
Pseudacropsilus claripennis Strobl, 1899 : 124.
Micromorphus albipes (Zetterstedt) Becker, 1918 : 124.
Micromorphus albipes (Zetterstedt) ; Parent, 1929 : 194.
Micromorphus albipes (Zetterstedt) ; Parent, 1938 : 652, figs. 904–907.

This species is widely distributed in Europe and has been recorded from Costa Rica and New Zealand (Parent, 1929) and North Africa (Parent, 1938).

1 ♂, NEPAL : Arun Valley, below Tumlingtar, River Sabhaya, west shore, c. 1,800′, dead leaves lying in sun on sandy shore, 22.xii.1961 (*R. L. Coe*).

Sympycnus laetus Becker

Sympycnus laetus Becker, 1922 : 94, fig. 42.
Pycsymnus laetus (Becker) Frey, 1925 : 21.
Pycsymnus laetus (Becker) ; Frey, 1928 : 20.
Sympycnus laetus Becker ; Parent, 1932a : 115.

Originally described from Formosa, New Guinea, Seleo and Singapore and later recorded from the Philippines (Frey, 1928) and Sumbawa and Flores (Parent, 1932a).

3 ♂, 1 ♀, NEPAL : Arun Valley, R. Arun below Tumlingtar, c. 1,800′, 14–23.xii.1961, evergreen shrubs bordering dry stream beds ; 2 ♂, 1 ♀, above R. Sabhaya, east shore, swept from dwarf bamboos in deep ravine, c. 2,000′, 12.xii.1961 (*R. L. Coe*).

Sympycnus turbidus Becker

Sympycnus turbidus Becker, 1922 : 105.
Pycsymnus turbidus (Becker) Frey, 1925 : 21.
Sympycnus turbidus Becker ; Parent, 1932a : 115.

Described from Kurseong, Eastern Himalayas (4,700′), and recorded from the Philippines (Frey, 1925) and Flores (Parent, 1932a).

1 ♂, Nepal : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

Sympycnus gummigutti Becker

Sympycnus gummigutti Becker, 1922 : 95, fig. 53.

Described from Nepal, Burma and Darjeeling.

Sympycnus arunensis sp. n.

(Text-figs. 26–29)

♂. Frons shining metallic green-violet. Antennae with segments 1 and 2 yellow, latter with an apical crown of short bristles ; 3rd antennal segment brown, triangular, not longer than wide and bearing a pubescent arista dorsally. Eyes short pale haired, contiguous over face. Palpi and proboscis yellow-brown. Occiput grey, post-ocular cilia uniserial, black above, pale laterally and ventrally.

Dorsum of thorax yellow with a broad, longitudinal, metallic green stripe medially ; acrostical bristles biserial, 6 pairs of dorso-centrals. Scutellum metallic green centrally but broadly yellow laterally and apically, bearing 2 strong marginal bristles. Pleurae yellow.

Abdomen yellow but tergites have small, triangular, black patches dorsally at anterior margins. Hypopygium brown ; lamellae yellow, pale haired, pointed oval.

Legs completely yellow, dark bristled. Fore-tibia without bristles ; fore-tarsal segments bear a ventral fringe of short hairs, the basitarsus bearing a longer hair in the basal third. Leg 2—tibia bowed, with 3 antero-dorsal, 1 postero-dorsal and an antero-ventral fringe of hairs which become longer towards tibial tip, intermingled with this fringe apically are 5 long, sinuous bristles ; basitarsus bears 3 sinuous bristles ventrally and a group of 3 hairs which mat at their tips. Leg 3—tibia with 3 dorsal bristles ; basitarsus much reduced, 2nd tarsal segment not as long as basitarsus and bearing a bifid lobe apico-ventrally, 3rd segment over twice as long as segments 1 and 2 together and with a ventral row of short bristles.

Wings pale brown hyaline ; 3rd and 4th veins slightly convergent ; posterior cross-vein longer than apical section of 5th vein. Squamae pale with darker tips and brown cilia. Halteres yellow.

♀. Similar to ♂ but with eyes separated over face which is violet above and silver pruinose below ; legs not ornamented ; tibia 2 with 3 antero-dorsal, 2 postero-dorsal and 2 antero-ventral bristles ; 2nd segment of hind tarsus twice as long as basitarsus.

Length 3·5 mm.

Holotype ♂, Nepal : Arun Valley, below Tumlingtar, River Sabhaya, west shore, c. 1800′, evergreen shrubs on sandy shore, 9–17.xii.1961 (*R. L. Coe*).

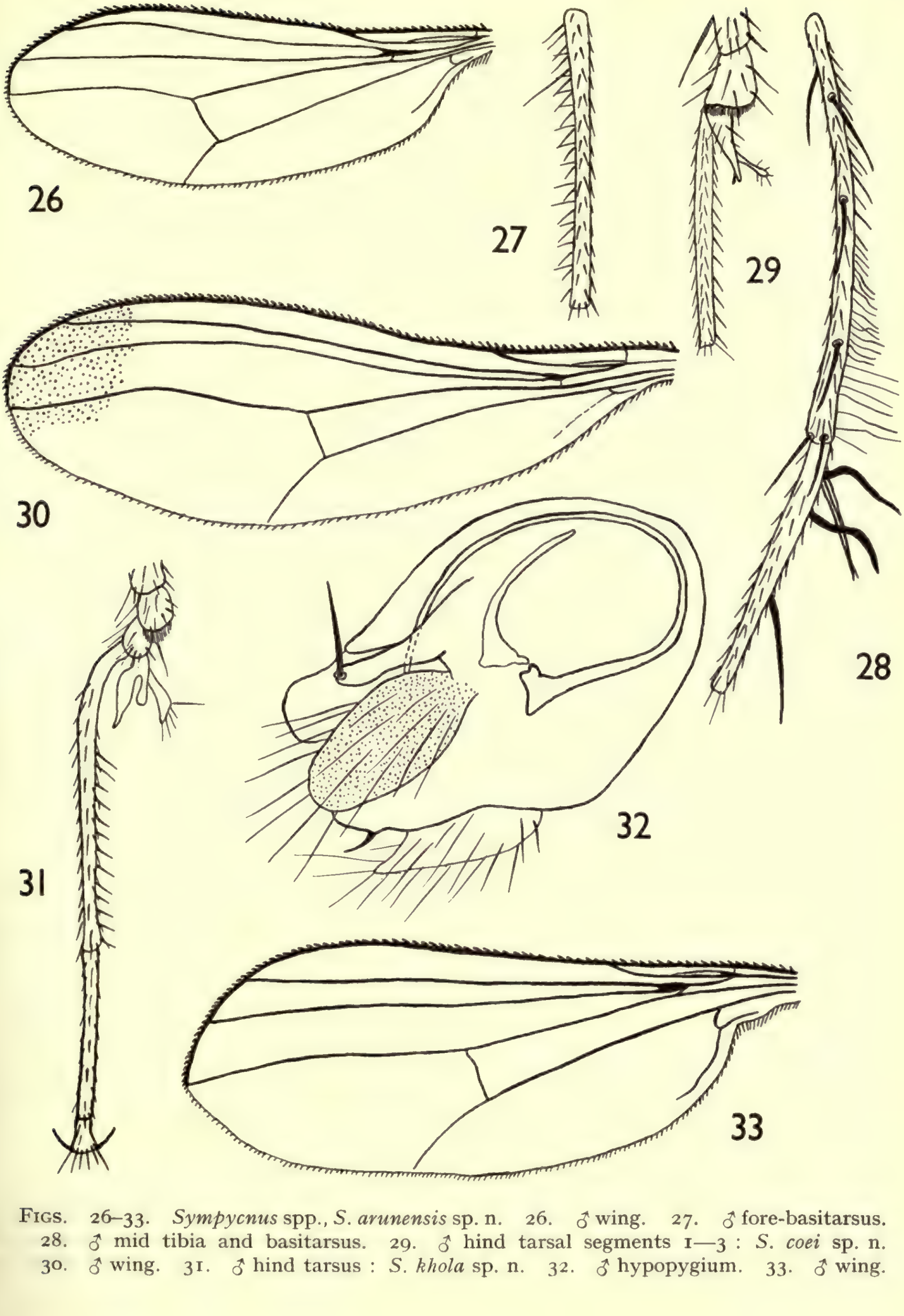
Paratype ♀, east shore of R. Arun below Tumlingtar, c. 1,800′, 14–23.xii.1961, evergreen shrubs bordering dry stream bed (*R. L. Coe*).

This species is close to *maculatus* Parent, 1932, and is in the *apicalis* group, a key to which is given below.

Sympycnus coei sp. n.

(Text-figs. 30, 31)

♂. Frons wide, shining metallic blue-green. Antennae with segments 1 and 2 completely yellow, latter with an apical crown of short bristles ; 3rd segment brown-black, triangular, not longer than wide and bearing a pubescent arista dorsally. Eyes short pale haired, contiguous over most of face. Palpi yellow, proboscis brown. Occiput grey dusted ; postocular cilia uniserial, black above, pale laterally and ventrally.



FIGS. 26–33. *Sympycnus* spp., *S. arunensis* sp. n. 26. ♂ wing. 27. ♂ fore-basitarsus. 28. ♂ mid tibia and basitarsus. 29. ♂ hind tarsal segments 1—3 : *S. coei* sp. n. 30. ♂ wing. 31. ♂ hind tarsus : *S. khola* sp. n. 32. ♂ hypopygium. 33. ♂ wing.

Dorsum of thorax metallic green centrally, broadly yellow at anterior and lateral margins ; acrostical bristles absent, 6 pairs of dorso-central bristles. Scutellum metallic green on disc but with completely yellow margins and bearing 2 strong marginal bristles. Post-scutellum and post-notum with a median longitudinal brown stripe. Pleurae yellow with a dark triangular spot at wing base.

Abdomen with venter completely yellow, tergites triangularly black-brown dorsally except tergite 1 which is completely yellow. Lamellae yellow, pale haired, pointed oval, ventral lobes chitinised.

Legs with coxae yellow, dark bristled. Femora yellow, posterior pair with a few long hairs at the base ventrally and a single pre-apical bristle. Leg 1—tibia yellow, without bristles ; tarsus not ornamented, basitarsus as long as tibia and as long as following tarsal segments together. Leg 2—tibia yellow with 3 antero-dorsal, 1 postero-dorsal and 2 ventral bristles ; basitarsus yellow and as long as following tarsal segments together, these being darker. Leg 3—tibia yellow with no long bristles although all bristles are slightly longer than those on the anterior and middle legs ; basitarsus yellow, very short and with 2 long, pale hairs ventrally, 2nd tarsal segment shorter than basitarsus and with a bilobed ventral appendage, 3rd tarsal segment longer than segments 4 and 5 together and with a ventral row of short bristles, tarsal segments 4 and 5 brownish, the 4th four times as long as the 5th.

Wings as long as fly, anal corner not developed ; hyaline but with an apical brown spot ; posterior cross-vein shorter than apical section of 5th vein. Squamae pale with dark tips and brown cilia Halteres yellow.

♀. Similar to ♂ but eyes separated over face which is silver pruinose (brown from below) ; hind tarsus simple, with 2nd segment twice as long as basitarsus and almost twice as long as 3rd segment ; wings without apical brown spot.

Length 4–4·5 mm.

Holotype ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, xi.1961–i.1962 (*R. L. Coe*).

Paratypes 25 ♂, 27 ♀, same data as Holotype ; 2 ♂, 4 ♀, above Sangu, mixed vegetation in dried up ravine, c. 6,800′, 16.ii.1962 ; 1 ♀, edge of mixed forest above Sangu, c. 6,500′, 17.x–1.xi.1961 ; 1 ♀, below Sangu, c. 4,000′, mixed vegetation on sheltered slopes above river, 3.i.1962 ; 1 ♀, Dobhan, east bank of River Tamur, c. 3,500′, mixed vegetation by stream in deep gully, i–ii.1962 (*R. L. Coe*).

Four paratypes (2 ♂, 2 ♀) bearing same data as Holotype are deposited in the Zoölogisch Museum, Amsterdam.

S. coei sp. n. clearly belongs to the *apicalis* group, the species of which may be separated by the following key :—

KEY TO *apicalis* GROUP OF *Sympycnus*

1 Antennae completely yellow . . . . **gummigutti** Becker
– Antennae partly, or completely dark 2
2 Antennae completely black ; acrostical bristles uniserial ; in ♂ wings with 3 small, dark spots apically, legs 1 and 3 ornamented . . **thienemanni** (Stackelberg 1931)
– Antennae in part yellow ; acrostical bristles biserial or absent 3
3 Acrosticals biserial 4
– Acrosticals absent 5
4 3rd antennal segment twice as long as broad ; dorsum of thorax broadly green ; in ♂ tibia 2 without special hairs or bristles . . . . . **acuticornis** Frey
– 3rd antennal segment as long as broad ; dorsum of thorax narrowly green ; in ♂ tibia 2 with a complete row of special hairs ventrally . . . . . **arunensis** sp. n.

5 Wing with an apical brown spot (♂) 7

– Wing clear hyaline (♀) 6

6 Posterior cross-vein shorter than apical section of 5th vein . . ***coei*** sp. n. ♀

– Posterior cross-vein as long as apical section of 5th vein . . ***apicalis*** de Meijere ♀

7 All pairs of legs modified in some way ; posterior cross-vein as long as apical section of 5th vein 8

– Only hind leg modified ; posterior cross-vein shorter than apical section of 5th vein ***coei*** sp. n. ♂

8 Tibia 2 without longer hairs at the base ventrally ; tibia 3 ventrally with 4 sub-apical hairs standing at 90° to tibia . . . . ***apicalis*** de Meijere ♂

– Tibia 2 with longer hairs at the base ventrally ; tibia 3 without hairs ventrally ***maculatus*** Parent ♂

Sympycnus khola **sp. n.**

(Text-figs. 32, 33)

♂. Frons shining metallic green, weakly grey dusted. Antennae brown-black ; 3rd segment triangular, not longer than wide and bearing a pubescent arista dorsally. Face narrow, silver pruinose but appearing black from front. Proboscis and palpi brown. Eyes short pale haired, narrowly separated over face.

Dorsum of thorax shining metallic blue-violet, yellow on anterior and lateral margins ; acrostical bristles biserial, 6 pairs of dorso-centrals. Scutellum blue-violet on disc but yellow at margins and bearing 2 strong marginal bristles. Pleurae mainly yellow, pteropleura with a dark spot below squamae, metapleura brown.

Abdomen with venter yellow, segments 1–4 brown-black laterally and dorsally, segment 5 and hypopygium yellow ; latter enclosed ; lamellae yellow, lateral appendages chitinised.

Legs with coxae yellow, dark bristled, middle pair with a dark spot externally in the postero-basal corner, hind pair with 1 external bristle. Femora yellow, middle and posterior pairs with single external bristles. Leg 1—tibia yellow, without bristles ; basitarsus yellow and as long as tarsal segments 2 and 3 together, segments 2–5 brown. Leg 2—tibia yellow with 3 antero-dorsal, 2 postero-dorsal, 2 antero-ventral and 1 postero-ventral ; tarsus yellow-brown, simple. Leg 3—tibia yellow with 1 antero-dorsal, 2 postero-dorsal and 3 short ventral bristles ; basitarsus yellow and shorter than segment 2 which is simple, segments 2–5 brownish.

Wings hyaline ; 3rd and 4th veins slightly divergent ; apical section of 5th vein not twice as long as posterior cross-vein. Squamae pale with brown cilia. Halteres pale yellow.

♀. Similar to ♂.

Length 2 mm.

Holotype ♂, NEPAL : Taplejung Distr., between Sangu and Tamrang, x–xi.1961, mixed shrubs in deep gorge, c. 5,200′ (*R. L. Coe*).

Paratypes 1 ♂, same data as Holotype ; 1 ♀, mixed plants by damp cliff in deep river gorge, c. 5,200′, i–ii.1962 (*R. L. Coe*).

S. laetus Becker, 1922, has a superficial resemblance to *khola* sp. n. but differs in that the 1st and 2nd antennal segments are yellow and, in the ♂, the hind tarsus is slightly modified.

Sympycnus gauri **sp. n.**

(Text-fig. 34)

♂. Frons shining metallic blue-violet. Antennae completely black ; 3rd segment triangular, longer than wide and bearing a pubescent arista dorsally. Eyes short pale haired, contiguous over face. Palpi and proboscis dark.

Dorsum of thorax metallic green ; acrostical bristles irregularly uniserial, 5 pairs of dorsocentrals. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae metallic green-black, grey dusted.

Abdomen mainly metallic green, 1st segment yellow basally. Hypopygium enclosed.

Legs with coxae dark, pale at tips, dark bristled, posterior pair with 1 bristle externally. Femora mainly dark but pale basally and apically, anterior and middle pairs with ventral fringes of long, dark hairs. Leg 1—simple, yellow-brown, tibia without bristles or hairs. Leg 2—tibia yellow with 2 antero-dorsal, 1 postero dorsal and no ventral bristles ; tarsus brown, simple. Leg 3—tibia yellow with 1 antero-dorsal, 2 postero-dorsal and no ventral bristles ; tarsus simple, basitarsus yellow, shorter than segment 2, segments 2–5 brown.

Wings hyaline ; 3rd and 4th veins parallel, apical section of 5th vein almost twice as long as posterior cross-vein. Squamae brown, cilia black. Halteres pale yellow.

♀. Unknown.

Holotype ♂, NEPAL : Taplejung Distr., river banks below Tamrang Bridge, c. 5,500′, x–xi.1961 (*R. L. Coe*).

Paratype ♂, same data as Holotype.

This species is similar to *residuus* Becker, 1922, described from Formosa, but the latter species may be distinguished by the absence of acrostical bristles, yellow coxae and femora, the latter without ventral hair fringes, and the relatively shorter posterior cross-vein.

***Sympycnus albipes nepalensis* subsp. n.**

(Text-figs. 35–37)

Sympycnus albipes Lamb, 1926 : 548, figs. 7–10.

♂. Frons shining metallic blue-green, weakly pale dusted. Antennae mainly brown-black ; 3rd segment yellowish at base, triangular, not longer than wide and bearing a pubescent arista dorsally. Eyes short pale haired, contiguous over face. Palpi and proboscis yellow. Occiput grey dusted ; post-ocular cilia uniserial, black.

Dorsum of thorax shining metallic green, acrostical bristles uniserial, 6 pairs of dorso-centrals. Scutellum metallic green on disc but lateral and posterior margins broadly yellow, bearing 2 strong marginal bristles. Pleurae metallic green above, yellowish below.

Abdomen with 1st segment green, 2nd segment yellow, remaining segments and hypopygium green.

Legs with coxae yellow, dark bristled, posterior pair with a single bristle externally. Femora yellow, anterior pair with a few scattered long hairs ventrally, posterior pair with single preapical bristles. Leg 1—tibia yellow, without bristles but with a row of 5–6 long hairs ventrally in the apical half ; basitarsus yellow, longer than following segment and with a row of short hairs ventrally, 2nd segment brown, longer than 3rd segment which is as long as segments 4 and 5 together, 4th segment with some long hairs dorsally, 4th and 5th segments whitish. Leg 2—tibia yellow with 2 weak antero-dorsal and 3 weak ventral bristles ; basitarsus yellow, following tarsal segments brown. Leg 3—tibia mainly yellow, broadly brown apically, with 2 antero-dorsal, 1 postero-dorsal and no ventral bristles ; tarsus brown, basitarsus short with 1 bristle ventro-medially, 2nd segment shorter than basitarsus and with a long, thin, apico-ventral lobe, 3rd segment longer than segments 4 and 5 together.

Wings hyaline ; 3rd and 4th veins parallel apically, apical section of 5th vein over twice as long as posterior cross-vein, anal vein weak. Squamae pale, cilia dark. Halteres yellow.

♀. Similar to ♂ but with eyes separated over face which is blackish ; legs simple, 2nd segment of hind tarsus longer than basitarsus.

Length 2–2·5 mm.

Holotype ♂, NEPAL : Arun Valley, east shore of R. Arun below Tumlingtar, c. 1,800′, 14–23.xii.1961, evergreen shrubs bordering dry stream-beds (*R. L. Coe*).

Paratypes 1 ♂, same data as Holotype ; 1 ♀, above River Sabhaya, east shore, swept from dwarf bamboos in deep ravine, c. 2,000′, 12.xii.1961 (*R. L. Coe*).

S. albipes albipes Lamb, 1926, was described from Rodriguez Island and recorded from the Seychelles and Ceylon. The new subspecies may be separated from it by the following points :– partly yellow antennae, fewer and longer acrostical bristles, much less darkened hind tibial tip and, in the ♂, the more numerous and shorter ventral hairs on the fore-tibia.

In Becker's key, 1922, to the Oriental species of *Sympycnus* both subspecies will run to *strenuus* Becker, 1922, but this species has a reddish 3rd antennal segment and an unmodified fore-tibia and tarsus.

Sympycnus peniculitarsus **sp. n.**

(Text-fig. 38)

♂. Frons one-third width of head, shining metallic green-blue, weakly pale dusted. Antennae with first and second segments black ; segment 3 brownish yellow, triangular, not longer than wide and bearing a pubescent arista dorsally. Eyes short pale haired, contiguous over face. Palpi and proboscis dark. Occiput grey ; post-ocular cilia uniserial, black above, pale laterally and ventrally.

Dorsum of thorax shining metallic green with bluish and bronze tinges ; acrostical bristles uniserial, 5 pairs of dorso-centrals. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae metallic green, grey dusted.

Abdomen mainly green-black, segment 2 and anterior margin of segment 3 yellow dorsally, segments 3 and 4 yellow ventrally. Hypopygium enclosed.

Legs with coxae pale, dark bristled, posterior pair with 1 bristle externally. Femora yellow, middle and posterior pairs with single pre-apical bristles, posterior pair dark at tip. Leg 1—tibia yellow, without bristles but with a complete ventral fringe of pale hairs ; tarsus yellow, 2nd segment with a ventral extension in basal two-thirds forming a notch in which is situated a group of short, chitinised hairs. Leg 2—tibia yellow, with 3 antero-dorsal, 1 postero-dorsal, 1 antero-ventral and no postero-ventral bristles ; tarsus brown, simple. Leg 3—tibia yellow, with 3 antero-dorsal, 2 postero-dorsal and 1–2 short ventral bristles ; tarsus brown, simple, basitarsus shorter than following segment.

Wings hyaline ; 3rd and 4th veins parallel apically, apical section of 5th vein almost 3 times as long as posterior cross-vein, anal vein weak. Squamae pale, cilia dark. Halteres yellow.

♀. Similar to ♂ but with eyes separated over face and simple fore-leg.

Length 1·5–2 mm.

Holotype ♂, NEPAL : Arun Valley, below Tumlingtar, River Sabhaya, west shore, c. 1,800′, evergreen shrubs on sandy shore, 9–17.xii.1961 (*R. L. Coe*).

Paratypes 3 ♂, same data as Holotype ; 13 ♂, 9 ♀, above R. Sabhaya, east shore, swept from dwarf bamboos in deep ravine, c. 2,000′, 12.xii.1961 ; 20 ♂, 17 ♀, east shore of R. Arun below Tumlingtar, c. 1,800′, 14–23.xii.1961, evergreen shrubs bordering dry stream-beds (2 ♂ and 2 ♀ of this series deposited in the Zoölogisch Museum, Amsterdam) ; 2 ♂, 4 ♀, swept from *Ricinus communis* L., 23.xii.1961 ; 13 ♂, 24 ♀, Taplejung Distr., below Sangu, c. 4,000′, mixed vegetation on sheltered slopes above river, 3.i.1962 (2 ♂ and 2 ♀ of this series are deposited in the Entomological Institute, Hokkaido University, Sapporo) ; 3 ♀, shady places on shrubby slope above R. Tamur, 21–27.i.1962 ; 1 ♂, 3 ♀, Dobhan, c. 3,500′, mixed vegetation in dry gully on wooded slope, 29.i.1962 ; 1 ♂, 1 ♀, evergreen trees overhanging stream in deep gully, 30.i.1962 ; 8 ♂, 11 ♀, east bank of River Tamur, c. 3,500′, mixed vegetation by stream in deep gully, i–ii.1962 (*R. L. Coe*).

S. turbidus Becker, 1922, is close to *peniculitarsus* sp. n. but may be distinguished from the latter by its black 3rd antennal segment, hind tibia with 3 ventral bristles and, in the ♂, the simple fore-leg.

***Sympycnus takagii* sp. n.**

(Text-figs. 39, 40)

♂. Frons metallic blue-violet, grey dusted. Antennae black ; 3rd segment triangular, almost twice as long as wide, long haired and bearing a pubescent arista dorsally. Face very wide, half width of frons, metallic green but heavily grey dusted. Palpi and proboscis dark. Eyes short pale haired, widely separated below antennae. Occiput grey ; post-ocular cilia uniserial, black above, pale laterally and ventrally.

Dorsum of thorax metallic blue-green, heavily yellow-brown dusted ; acrostical bristles absent, 5 pairs of dorso-centrals. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae metallic green, grey dusted.

Abdomen long, completely metallic green, hypopygium enclosed.

Legs with anterior coxae yellow, dark bristled ; middle and posterior pairs dark, pale at tips, hind pair with single bristles externally. Femora yellow, posterior pair darkened dorsally in the apical half. Leg 1—tibia yellow, without bristles ; basitarsus yellow, following tarsal segments brown. Leg 2—tibia yellow with 2 antero-dorsal and 1 antero-ventral bristle ; tarsus yellow-brown. Leg 3—tibia yellow with 1 antero-dorsal, 3 postero-dorsal and 3 short ventral bristles ; tarsus brown, basitarsus shorter than following segment.

Wings pale brown hyaline ; 3rd and 4th veins parallel in their apical sections, apical section of 5th vein over twice as long as posterior cross-vein, anal vein weak. Squamae and cilia brown. Halteres brown.

♀. Unknown.

Length 2 mm.

Holotype ♂, Nepal : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, xi.1961–i.1962 (*R. L. Coe*).

Paratype ♂, same data as Holotype.

This species is distinct from other Oriental species of *Sympycnus* by virtue of the extremely wide face in the ♂. *S. residuus* Becker, 1922, described from Formosa, is perhaps closest but may be separated by the completely yellow coxae, the relatively shorter 3rd antennal segment and the narrower face in the ♂.

***Sympycnus pahar* sp. n.**

(Text-fig. 41)

♂. Frons metallic blue-violet, grey dusted. Antennae with segments 1 and 2 black ; 3rd segment brown, triangular, as long as wide and bearing a pubescent arista dorsally. Face narrow, dark. Palpi and proboscis dark. Eyes short pale haired, narrowly separated over face. Occiput grey ; post-ocular cilia uniserial, black dorsally, pale laterally and ventrally.

Dorsum of thorax metallic green, heavily grey dusted and with a median longitudinal brown stripe ; acrostical bristles absent, 5 pairs of dorso-centrals. Scutellum concolorous with dorsum with margins narrowly yellow and bearing 2 strong bristles. Pleurae metallic green-black, grey dusted.

Abdomen long, metallic green-black. Hypopygium enclosed.

Legs with anterior coxae pale, dark at tips and with dark bristles ; middle and posterior coxae dark, pale at tips, posterior pair with 1 external bristle. Femora yellow, hind pair without pre-apical bristles. Leg 1—tibia yellow, without bristles ; tarsus yellow. Leg 2—tibia yellow with 2 antero-dorsal, 1 postero-dorsal and no ventral bristles ; tarsus simple, yellow. Leg 3—tibia yellow with 2 postero-dorsal and 3 short ventral bristles ; tarsus brown, basitarsus shorter than following tarsal segment.

Wings hyaline ; 2nd and 3rd veins strongly divergent, 3rd and 4th veins parallel in their apical sections, apical section of 5th vein over twice as long as posterior cross-vein, anal vein weak. Squamae and cilia brown. Halteres yellow.

♀. Similar to ♂ but with wider face.

Length 2 mm.

Holotype ♂, Nepal : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, xi.1961–i.1962 (*R. L. Coe*).

Paratypes 1 ♂, same data as Holotype ; 1 ♂, below Sangu, by stream in shady ravine, c. 6,000′, 30.x.1961 ; 1♀, between Sangu and Tamrang, mixed plants by damp cliff in deep river gorge, c. 5,200′, 22.xi.1961 (*R. L. Coe*).

This species is close to *takagii* sp. n. from which it may be distinguished by the completely yellow hind femur and, in the ♂, the narrower face and shorter 3rd antennal segment.

Key to Nepalese species of *Sympycnus*

1 Thorax with pleurae and sides of dorsum broadly yellow 2
– Dorsum of thorax completely metallic green 6
2 Antennae completely dark ; acrostical bristles biserial ; in ♂ legs simple **khola** sp. n.
– Antennae at least in part yellow ; in ♂ at least hind basitarsus modified . . 3
3 Antennae completely yellow ; in ♂ fore-tibia with a hair-like bristle apically **gummigutti** Beck
– Antennae with 1 or more segments dark 4
4 Acrostical bristles present and biserial 5
– Acrostical bristles absent ; abdomen with segments triangularly black dorsally ; ♂ wing with apical brown spot and only hind basitarsus modified . . . **coei** sp. n.
5 Abdomen mainly yellow ; 3rd and 4th wing veins slightly convergent ; posterior cross-vein as long as apical section of 5th vein ; in ♂ all pairs of legs ornamented **arunensis** sp. n.
– Abdomen mainly brown ; 3rd and 4th long veins parallel ; apical section of 5th vein twice as long as posterior cross-vein ; in ♂ only hind basitarsus slightly modified **laetus** Beck
6 All coxae dark, femora dark ; acrostical bristles irregularly uniserial ; in ♂ anterior and middle femora with long hairs ventrally . . . . . . **gauri** sp. n.
– At least anterior coxae pale 7
7 Only anterior coxae pale ; acrostical bristles absent ; in ♂ face wide . . 8
– All coxae pale ; acrostical bristles present 9
8 3rd antennal segment much longer than wide ; hind femora brown in apical half dorsally ; anterior coxae completely yellow . . . . . . **takagii** sp. n.
– 3rd antennal segment not longer than wide ; hind femora completely yellow ; anterior coxae darkened at tips . . . . **pahar** sp. n.
9 Scutellum broadly yellow around posterior margin ; in ♂ fore-tibia with long hairs ventrally and posterior basitarsus modified . . . **albipes nepalensis** subsp. n.

– Scutellum completely green ; in ♂ fore-tibia and posterior basitarsus simple . 10

10 Hind tibia with 1–2 ventral bristles ; in ♂ 2nd tarsal segment of fore-leg with basal two-thirds extended ventrally and forming a notch which carries a brush of short, stout hairs . . . . ***peniculitarsus*** sp. n.

– Hind tibia with 3 ventral bristles ; in ♂ fore-tarsus simple . . ***turbidus*** Beck

Chrysotimus anomalicerus **sp. n.**

(Text-figs. 42–44)

♂. Frons wide, metallic blue-green, weakly pale dusted. Antennae with segments 1 and 2 yellow, former bare above, latter with an apical crown of short bristles ; 3rd segment brown-black, long haired, rounded basally and with elongate apical region, forming an appendage which is thicker and longer than arista ; latter short, only as long as width of frons and borne dorsally on 3rd antennal segment. Face narrow, silver dusted. Palpi and proboscis pale. Eyes short pubescent, narrowly separated over face. Head bristles yellow, 1 pair of orbitals, 1 pair of inter-ocellars, post-ocular cilia uniserial.

Dorsum of thorax shining metallic green, pale dusted. Bristles yellow, acrostical bristles uniserial, 5 pairs of dorso-centrals. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae metallic blue-green, grey dusted.

Abdomen metallic green, evenly short, pale bristled. Hypopygium enclosed.

Legs completely yellow, yellow bristled. Posterior coxae with a single external bristle. Femora without bristles. Leg 1—tibia without bristles ; basitarsus shorter than tibia but as long as tarsal segments 2 and 3 together. Leg 2—tibia with 2 antero-dorsal, 1 postero-dorsal, no ventral bristles and a crown of bristles apically ; tarsus simple. Leg 3—tibia with rows of short dorsal and ventral bristles ; basitarsus shorter than segment 2.

Wings hyaline, pointed at tip ; 3rd and 4th veins slightly divergent, apical section of 5th vein over twice as long as posterior cross-vein, anal vein weak. Squamae and cilia pale. Halteres yellow.

♀. Similar to ♂ but with short 3rd antennal segment, longer arista and wider face.

Length 2 mm.

Holotype ♂, NEPAL : Taplejung Distr., below Sangu, by stream in shady ravine, c. 6,000′, 30.x.1961 (*R. L. Coe*).

Paratype ♀, Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

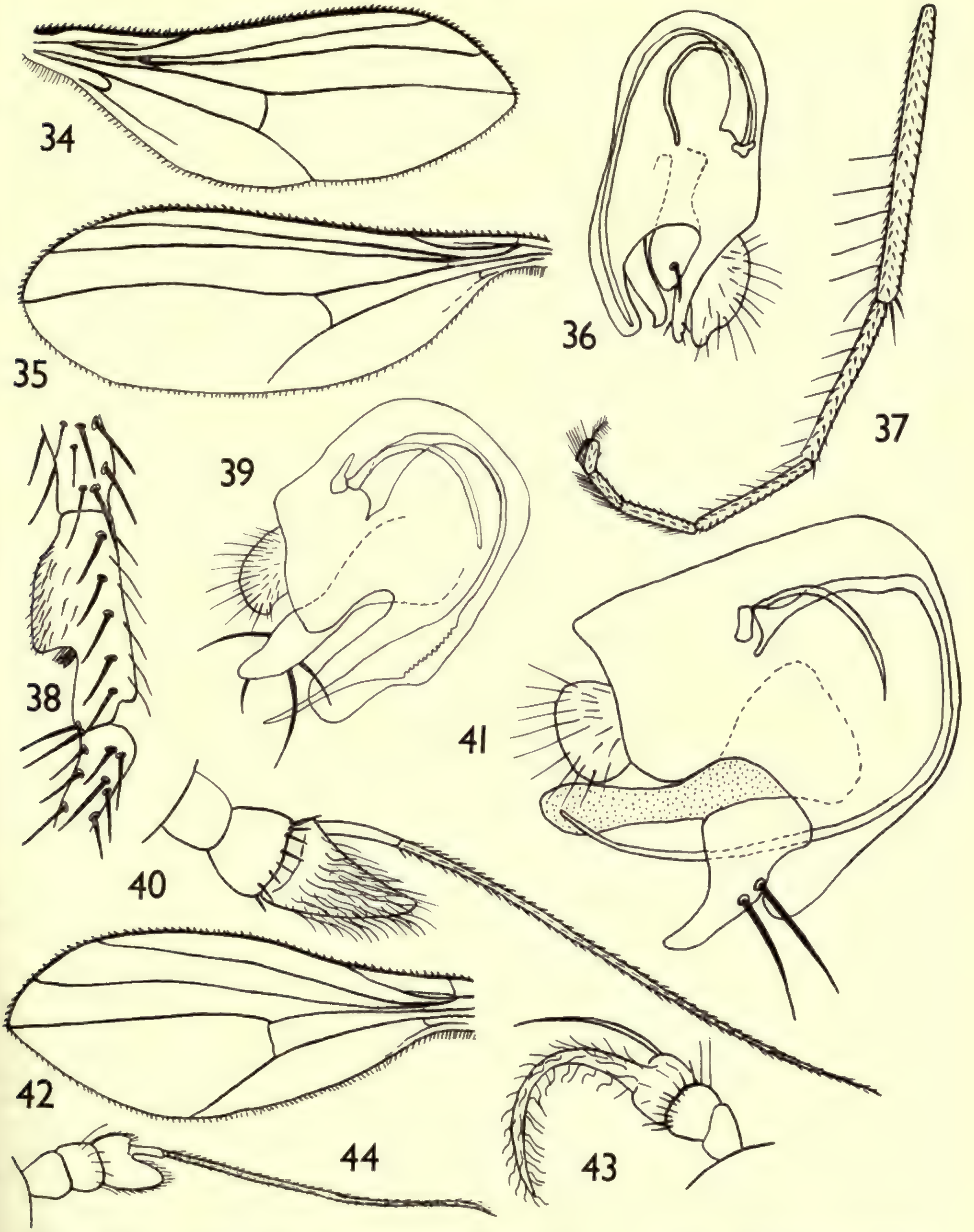
This species is only tentatively placed in the genus *Chrysotimus* as it differs from other known species in the extraordinary form of the 3rd antennal segment in the ♂. This structure is very similar to that of a few species in the South American genus *Kophosoma* van Duzee, 1926.

There are no previous records of *Chrysotimus* occurring in the Oriental region and the well defined uniserial acrostical bristles and the absence of yellow coloration in *anomalicerus* sp. n. render it unlike the known Palaearctic species of the genus.

NEPALOMYIA **gen. n.**

(Text-figs. 45–48)

Head higher than wide ; frons wide ; 1 pair of orbital bristles and 1 pair of inter-ocellar bristles, both pairs well developed ; post-vertical bristles not developed ; post-ocular bristles uniserial. Antennae placed above middle of head profile, shorter than head ; 1st segment short, bare above ; 2nd segment short, transverse, and with a crown of apical bristles ; 3rd segment



FIGS. 34–44. *Sympycnus gauri* sp. n. 34. ♂ wing : *S. albipes nepalensis* subsp. n. 35. ♂ wing. 36. ♂ hypopygium. 37. ♂ fore-tibia and tarsus : *S. peniculitarsus* sp. n. 38. ♂ 2nd segment of fore-tarsus : *S. takagii* sp. n. 39. ♂ hypopygium. 40. ♂ antenna : *S. pahar* sp. n. 41. ♂ hypopygium : *Chrysotimus anomalicerus* sp. n. 42. ♂ wing. 43. ♂ antenna. 44. ♀ antenna.

triangular, as long as wide and bearing a pubescent arista dorsally. Face wide in both sexes, with an incomplete transverse division and not reaching to lower eye margins. Eyes short haired. Palpi and proboscis well developed. Occiput concave.

Thorax longer than wide with a well developed pre-scutellar flattening in posterior third ; acrostical bristles biserial, 5 pairs of dorso-centrals, 1 prothoracic, 1 humeral, 1 internal post-humeral, 2 notopleurals, 1 weak sutural, 2 supra-alars and 1 post-alar. Scutellum semicircular with 2 strong marginal bristles.

Abdomen long with 5 unmodified segments, only tergite 1 with longer posterior marginal bristles ; hypopygium sessile but not enclosed, highly complex.

Legs long and fragile, bristles weak. Posterior coxa with a single external bristle. Femur 3 with or without pre-apical bristles. Tibia 2 with an apical crown of bristles. Posterior basitarsus shorter than following tarsal segment.

Wings with 2nd and 3rd veins divergent, 3rd and 4th veins parallel, posterior cross-vein slightly before middle of wing and shorter than apical section of 5th vein, anal vein present and reaching almost to posterior wing margin.

Type species :— *Nepalomyia dytei* sp. n.

The affinities of this genus are obscure but probably the closest known genus is *Xanthochlorus* Loew, 1857. The two genera show some similarities especially in the form and complexity of the ♂ genitalia (see Becker, 1918 : 129).

Xanthochlorus differs from *Nepalomyia* in the following characters :— a basal arista, absence of acrostical bristles, hind basitarsus longer than the following tarsal segment and reduction or absence of the anal vein.

***N. dytei* sp. n.**

(Text-figs. 45, 46)

♂. Frons about one-third width of head, dark green, grey dusted. Antennae black ; 1st segment short, bare above ; 2nd segment shorter than 1st and with a crown of apical bristles ; 3rd segment triangular, as long as wide and bearing a pubescent arista dorsally. Face half width of frons, concave except above mouthparts, metallic green and grey dusted and with an incomplete transverse division. Palpi and proboscis black. Occiput concave, dark metallic green ; post-ocular bristles black and uniserial ; post-verticals not developed.

Dorsum of thorax metallic green, grey dusted, with a well developed pre-scutellar flattening in posterior third ; acrostical bristles biserial, 5 pairs of dorso-centrals. Scutellum concolorous with dorsum with 2 strong marginal bristles. Pleurae metallic green, grey dusted.

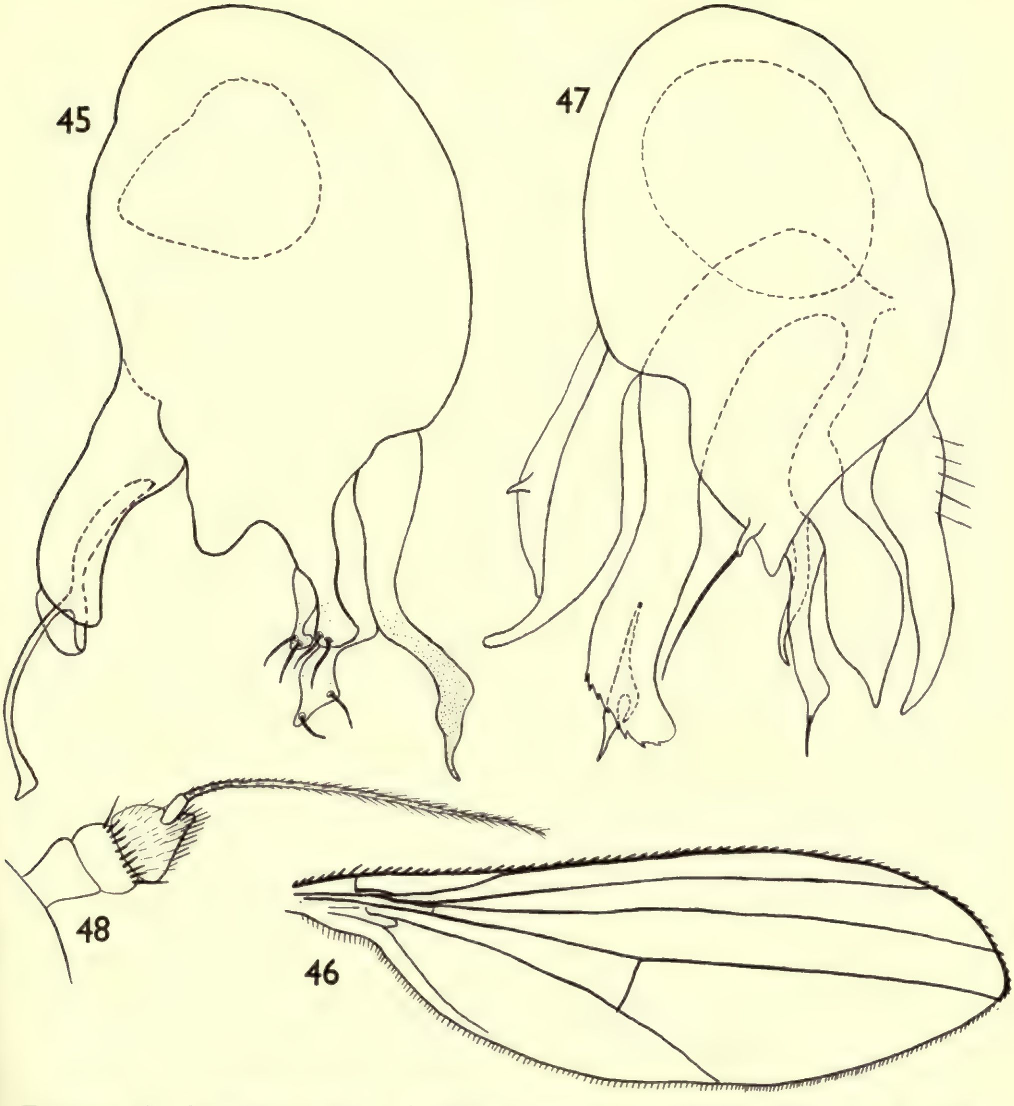
Abdomen dark metallic green, grey dusted ; evenly short bristled but 1st tergite with longer posterior marginal bristles. Hypopygium large, sessile but free ; appendages chitinised at tip, dorsal pair with hooked tips.

Legs mainly brown, only trochanters yellow. Posterior coxae with single external bristles. Posterior femora with or without pre-apical bristles. Leg 1—tibia without bristles ; basitarsus as long as tibia, 2nd tarsal segment shorter than basitarsus but longer than 3rd segment, latter longer than segments 4 and 5 together, these being of equal length. Leg 2—tibia with 2 antero-dorsal, 2 postero-dorsal and no ventral bristles ; basitarsus shorter than tibia but as long as segments 2 and 3 together. Leg 3—tibia with 1 antero-dorsal, 1 postero-dorsal and no ventral bristles ; basitarsus two-thirds length of following segment.

Wings very pale brown hyaline ; 2nd and 3rd veins divergent, 3rd and 4th veins parallel apically, posterior cross-vein three-fifths length of apical section of 5th vein, anal vein complete almost to posterior wing margin. Squamae brown, cilia black. Halteres pale yellow.

♀. Similar to ♂ but fore-basitarsus shorter than tibia and the 4th and 5th segments of the fore-tarsus are as long as the 3rd segment.

Length 2·5–3 mm.



FIGS. 45–48. *Nepalomyia* spp., *N. dytei* sp. n. 45. ♂ hypopygium. 46. ♂ wing : *N. confusa* sp. n. 47. ♂ hypopygium. 48. ♂ antenna.

Holotype ♂, NEPAL : Taplejung Distr., between Sangu and Tamrang, spray-splashed rocks in deep gorge, c. 5,200′, 6–28.xi.1961 (*R. L. Coe*).

Paratypes 2 ♂, 7 ♀, same data as Holotype ; 4 ♀, 1–14.ii.1962 ; 1 ♂, mixed plants by damp cliff in deep river gorge, c. 5,200′, 22.xi.1961 ; 1 ♀, x–xi.1961, mixed shrubs in deep gorge, c. 5,200 (*R. L. Coe*).

(2 ♀, bearing same data as Holotype, deposited in the Zoölogisch Museum, Amsterdam).

This species is defined in the key below.

N. confusa sp. n.

(Text-figs. 47, 48)

♂. Frons one-third width of head, dark green. Antennae yellow-brown ; 1st segment short, bare above ; 2nd segment shorter than 1st and with a crown of apical bristles ; 3rd segment triangular, as long as wide and bearing a pubescent arista dorsally. Face one-third width of frons, dark metallic green, flat with an incomplete transverse division. Palpi and proboscis black. Eyes short haired. Occiput dark, shining ; post-ocular bristles black, uniserial ; post-verticals not developed.

Dorsum of thorax green-brown, posterior calli and lateral margins of scutellum yellowish ; pre-scutellar flattening well developed ; acrostical bristles biserial, 5 pairs of dorso-centrals. Pleurae metallic green, grey dusted.

Abdomen brownish-green, venter yellow ; tergites evenly short bristled but tergite 1 with longer posterior marginal bristles. Hypopygium large, sessile but free, appendages not chitinised, dorsal pair not hooked.

Legs mainly yellow, only mid and posterior coxae brown in basal two-thirds. Coxae dark bristled, posterior pair with single external bristles. Femora short haired, posterior pair without pre-apical bristles. Leg 1—tibia without bristles ; basitarsus shorter than tibia, tarsal segments of decreasing lengths, segment 4 longer than segment 5. Leg 2—tibia with 2 antero-dorsal, 1 postero-dorsal and no ventral bristles ; basitarsus shorter than tibia but as long as segments 2 and 3 together. Leg 3—tibia with 1 antero-dorsal, 1 postero-dorsal, 1 ventral bristle and 1 longer sub-apical bristle externally ; basitarsus one-third length of 2nd tarsal segment.

Wings hyaline ; 2nd and 3rd veins divergent, 3rd and 4th veins parallel, posterior cross-vein half length of apical section of 5th vein, anal vein complete almost to posterior wing margin. Squamae yellow, cilia black. Halteres pale yellow.

♀. Similar to ♂.

Length 2·5–3 mm.

Holotype ♂, NEPAL : Taplejung Distr., Sangu, c. 6,200′, mixed vegetation by stream in gully, ix–x.1961 (*R. L. Coe*).

Paratype ♀, between Sangu and Tamrang, spray-splashed rocks in deep river gorge, c. 5,200′, 6–28.xi.1961 (*R. L. Coe*).

The two known species of the genus *Nepalomyia* may be distinguished as follows :—

1 Legs mainly brown ; antennae black ; in ♂ anterior leg with basitarsus as long as tibia, tarsal segment 3 longer than segments 4 and 5 together, these being of equal length ; hypopygium with appendages chitinised apically and dorsal pair with hooked tips . . . . **dytei** sp. n.

– Legs mainly yellow ; antennae yellow-brown ; in ♂ anterior leg with basitarsus shorter than tibia, segment 3 slightly longer than segment 4, latter 1½ times as long as segment 5 ; hypopygium with appendages not chitinised and dorsal pair not hooked apically but with a few hairs basally . . . . **confusa** sp. n.

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Commonwealth Institute of Entomology, London

Pp. 117–143 ; 120 *Text-figures*

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NEW SPECIES OF *UGYOPS* (FULGOROIDEA : DELPHACIDAE) FROM SOUTH AMERICA AND SOUTH-EAST ASIA

By R. G. FENNAH

SYNOPSIS

The external characters of value in classifying members of *Ugyops* (Fulgoroidea : Delphacidae) are discussed. Seventeen new species and two new subspecies are described from the following localities : Panama, Brazil, Narcondam Island, Krakatau Island, Thailand, Borneo, New Guinea, New Hebrides, New Caledonia and Niué.

SOME series of *Ugyops* from Brazil and south-east Asia standing in the unnamed accessions of the British Museum (Nat. Hist.) have proved to represent new species, and these are described below.

Our knowledge of this genus is still fragmentary. Its members are impressively widespread among oceanic islands of the Pacific, are found in the Mascarene Islands, and range through tropical South America into the Greater Antilles. In the continental areas of the Old World, however, the position, as far as yet known, is very different ; the genus is not represented in Africa and in continental Asia has been found only on the south-eastern seaboard, in " Cochin-China ". It is known that species of the genus occur in northern Australia, New Guinea, the Moluccas, Borneo and Sumatra and in some of the smaller islands of Indonesia, but the only evidence of its presence on the continent immediately north of Java and Sumatra is provided by specimens from Thailand in the present collection, and of its presence in the eastern part of the Indian Ocean by a specimen from Narcondam Island.

In the delphacine Delphacidae it is customary to seek differences in the form of the male genitalia as the chief criterion for distinguishing species. In some of the Asiracinae, however, including the genus *Ugyops*, it is the external bodily features that exhibit the greatest amount of diversity. The range of such variation between members of a series, even between the sexes, is relatively very small, whereas between members of different species (as determined by genitalic differences and sympatric distribution) there is an evident gap between the ranges found in each. It may accordingly be assumed that the form of such bodily features is of specific value.

The numerous re-combinations of " characters " found in members of *Ugyops* have so far not been found to form a pattern that would suggest a natural subgeneric classification. None the less, there are two main types of bodily form that afford a crude but useful basis for separating species-groups. The first of these is exemplified by the dimensions of *U. percheronii* Guér. and *U. kinbergi* Stål : members of these species are large, macropterous, with a narrow, usually parallel-sided, vertex, usually an acutely angulate profile, a frons about three times as long as broad, slender antennal segments and a pygofer elongate ventrally. The second is exemplified by *U. annulipes* Stål (placed by him in a separate genus, *Livatis*) : its members are moderately short, or even quite small, coelopterous (with the tegmina just covering the abdomen), and with a relatively broad vertex, often wider apically than at the base, a convex profile, a frons about two and a half times as long as broad, antennal segments not very slender, and a relatively short pygofer. In this second group wings may be present or absent ; the tegmina may be abbreviated to less than the length of the abdomen, and, rarely, may be brachypterous.

There is generally little difficulty in deciding to which of these groups a specimen of an unknown species belongs, but thereafter the task of establishing its relationship with a known species on the basis of a verbal description may be far from easy. In the writer's experience, the degree of curvature of the margins of the head, the form of the frontal carinae and the relative proportions of the head and of the antennal segments are reasonably constant within a species, as is the colour pattern of the body and tegmina (as opposed to the rather variable colour intensity) ; these characters, in combination, vary sufficiently between species to provide a reliable means for specific determination.

Variation in colour intensity between individuals of a species is common, but never extreme. Members of a series may, for instance, vary from very pale with small irregular dark areas to pale with each dark area twice as large (but occupying a truly corresponding position) : the range does not extend further to include the development of wholly dark coloration. As far as the writer knows, mere variation in intensity of pigmentation does not totally obscure the differences in colour pattern between one species and another.

The measurements of the antennal segments given below represent, in each instance, the distance from the base to the apex. The basal segment is often of unequal width throughout, and the width is arbitrarily measured at the middle. The vertex may be horizontal or declivous, and when declivous appears shorter in direct dorsal view than in a more or less anterodorsal view. The measurement of its length is taken in each case from whichever viewpoint the maximum length of vertex can be seen : the length is taken along the middle line, from the apex of the projection in the middle of the apical margin to the middle of the basal margin, which is often very slightly angulately produced caudad. The width at the base includes the thickness of the lateral margins at this level.

The writer's warmest thanks are tendered to the authorities of the British Museum (Natural History) and to Mr. J. P. Doncaster, Keeper of the Department of Entomology, for the privilege of studying this most interesting assemblage of specimens.

The types of all new species are in the British Museum (Natural History). The bibliographic references are cited in accordance with the usage in " A Bibliography of the Homoptera (Auchenorhyncha) " (Metcalf, Z.P. 1942 N.C. State College of Agriculture and Engineering, University of North Carolina, Raleigh, N.C.).

UGYOPS Guérin-Méneville

Guérin-Méneville 1834a : 477, Haplotype, *Ugyops percheronii* Guérin-Méneville 1834a, *loc. cit.*

Ugyops samoaensis Muir

Muir 1921d : 573.

Ugyops samoaensis ferus **subsp. n.**

Form and coloration similar to that of typical subspecies. Pygofer with posterior margin, in lateral view, produced caudad, the lobe shallowly excavate at middle with lower edge of excavation more strongly extended caudad than upper.

Holotype ♂ of subspecies, NIUÉ : iv–x.1918 (*H. C. Kellers*).

Paratypes, NIUÉ : 9 ♂, 3 ♀, iv–x.1918 (*H. C. Kellers*).

Type of subspecies in collection of the Hawaiian Sugar Planters Association. Muir recognized that this population was distinct from the typical form from Tutuila in Samoa, and described the difference in the conformation of the pygofer. This difference is now considered sufficiently important to warrant the application of a formal subspecific name to the Niué population.

The latter is rather similar to that of *U. necopinus* Fenn. (from Fiji), but *necopinus* differs from *samoaensis* in having a vertex relatively shorter in relation to its basal width (scarcely more than 1·4 : 1, as compared with more than 1·5 : 1 in *samoaensis*), and, in the male, an anal segment with the apical angles asymmetrically produced ventrocaudad (the margin in *samoaensis* being symmetrical).

Ugyops palliatus **sp. n.**

(Text-figs. 1–9)

Epibidis godmani Fowler 1905 : 131 (*pars*).
Epibidis brunnea Fowler 1905 : 132 (*pars*).

Vertex longer medially than broad at base (1·5 : 1), obtusely and evenly rounding into frons, as wide at apex as at base, lateral margins straight, apical margin biconcave with submedian carinae moderately prominent, submedian carinae not uniting at apex of vertex, basal compartment of vertex wider at hind margin than median length (nearly 1·7 : 1), frons in middle line longer than wide at widest part (nearly 2·5 : 1), widest at two-thirds from base, lateral margins shallowly sinuately convex, median carina very narrowly forked at extreme base. Rostrum reaching post-trochanters ; antennae reaching to apex of clypeus, basal segment shallowly sulcate dorsally, longer than broad at middle (4·4 : 1), second segment longer than first (1·8 : 1) ; ocelli very small. Pronotum with a single distinct carina at lateral margins. Post-tibiae laterally with four teeth.

Stramineous ; transverse barring on frons and on second antennal segment, light brown ; mottling on pronotum behind eyes and on mesonotum, anteclypeus, procoxae distally, mesopleura, transverse rings on fore and middle legs, spots at base of spines on hind legs, abdominal terga entirely, sterna only lateroposteriorly, and anal segment, castaneous. Tegmina milky hyaline, heavily overlain with fuscous brown in basal half, on stigma, and in an S-shaped fascia from claval apex to apical angle of tegmen, surrounding, but not overlying, apical line of cross-veins ; veins concolorous except at apical margin, and in nodal and subapical lines, where they are opaque yellow.

Anal segment of male large, lateroapical angles broad at base, each produced ventrad in an acute process. Pygofer long, lateral margins each produced caudad in a narrow lobe, obliquely truncate distally with one angle acute ; diaphragm with dorsal margin shallowly concave, a little notched at middle, medioventral process strongly trifid, outer lobes slightly exceeding middle lobe, all rounded apically. Genital styles as figured. Anal segment of female short, in lateral view scarcely longer than broad. Ovipositor distinctly surpassing apex of anal segment.

Male : length, 5·5 mm., tegmen, 7·0 mm.
Female : length, 6·0 mm., tegmen, 7·1 mm.

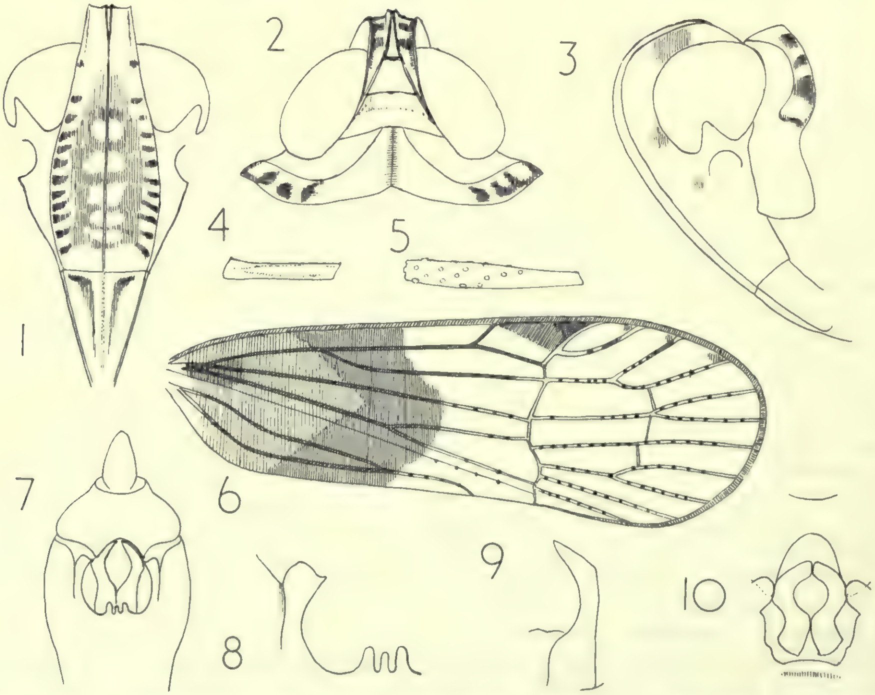
Holotype ♂, PANAMA : Volcan de Chiriqui, 2,5-4,000 ft., (*Champion*), B.M. (N.H.). Paratypes, same data, 1 ♂, 1 ♀.

These examples have hitherto stood in the typical series of *Epibidis godmani* Fowler. From this species *U. palliatus* differs in its relatively longer second antennal segment (the ratio of second to first in *godmani* is 1·6 : 1), colour pattern and, to a surprisingly large extent, in the male genitalia. The structures exhibited by *U. godmani* are shown for comparison. Superficially the two species can be separated by the continuous broad dark band across the middle of the tegmen in *palliatus*. The degree of extension of this band towards the base of the tegmen is variable : the maximum development is shown in the figure. *Epibidis brunnea* Fowler is of larger bodily size and of entirely different colour pattern as well as of a darker colour. A male of the present series has possibly been used to provide the description of the male genitalia given for *brunnea* by Fowler.

Ugyops godmani (Fowler), **comb. n.**

(Text-fig. 10)

Epibidis godmani Fowler 1905a : 131.



FIGS. 1–10. *Ugyops palliatus* sp. n. 1, Frons and clypeus ; 2, vertex and pronotum ; 3, head in profile ; 4, first antennal segment ; 5, second antennal segment ; 6, tegmen ; 7, posterior margin of pygofer, anal segment and genital styles, posteroventral view ; 8, ventral half of left lateral margin of pygofer ; 9, right genital style. *Ugyops godmani* (Fowler). 10, lower part of posterior margin of pygofer, genital styles, and posterior margin of anal segment.

A specimen marked with a red type label, and labelled *Epibidis godmani* Fowler (the only one so marked) is here selected as the lectotype, in B.M. (N.H.).

Ugyops brunneus (Fowler), **comb. n.**

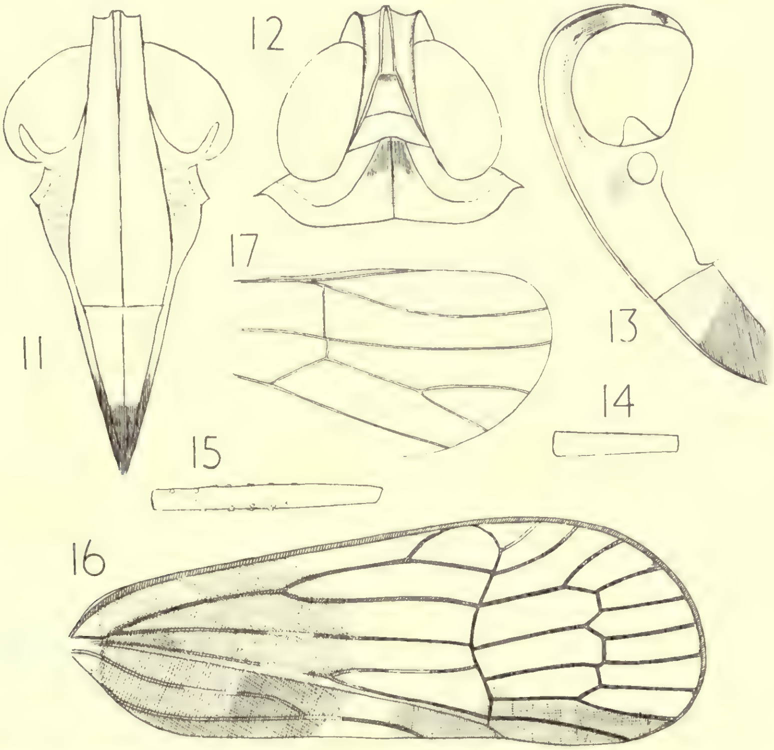
Epibidis brunnea Fowler 1905a : 132.

A female specimen labelled "*Epibidis brunnea* Fowl." and "Type H.T." is here selected as the lectotype, in B.M. (N.H.).

Ugyops tamu **sp. n.**

(Text-figs. 11–17)

Vertex longer medially than broad at base (2 : 1), broadly and evenly rounding into frons, very slightly wider at apex than at base, lateral margins straight, apical margin biconcave with submedian carinae distinctly prominent, submedian carinae narrowly uniting at basal fifth of frons, basal compartment of vertex wider at hind margin than median length (1·2 : 1), frons in middle line longer than wide at widest part (nearly 3 : 1), widest at four-fifths from base, lateral margins almost straight in basal half, shallowly concave distally, median carina simple in distal four-fifths, very narrowly forked in basal fifth ; rostrum reaching to post-trochanters ; antennae reaching slightly beyond apex of clypeus, basal segment longer than



FIGS. 11–17. *Ugyops tamu* sp. n. 11, Frons and clypeus ; 12, vertex and pronotum ; 13, head in profile ; 14, first antennal segment ; 15, second antennal segment ; 16, tegmen ; 17, apex of wing.

broad at middle (6·6 : 1), second segment longer than first (1·8 : 1); ocelli indicated only by a scar. Pronotum with lateral margins not carinate. Post-tibiae laterally with three teeth.

Stramineous; clypeus distally, coxae, femora, tibiae at base, abdominal terga near hind margins and third valvulae of ovipositor distally, dark castaneous; abdominal sternites marked with orange and fuscous brown. Tegmina milky hyaline, a suffusion overlying basal third and a submarginal band from union of claval veins to anal angle, reddish brown; veins reddish brown, sparsely interrupted with white. Wings hyaline, with dark veins.

Anal segment of female short, in profile little longer than broad.

Female: length, 5·4 mm., tegmen, 6·1 mm.

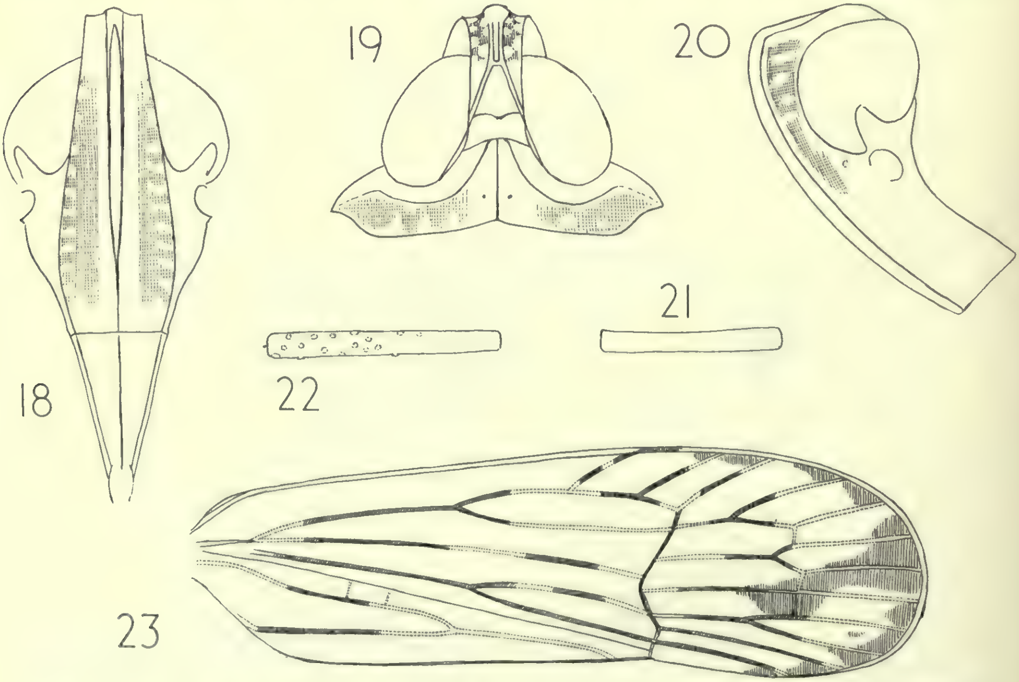
Holotype ♀, Brazil: Reg. No. 68.4 (1868, presented to B.M. (N.H.) by W. Wilson Saunders).

This species is allied to *U. vittifrons* (Wlk.) (1858a: 44), which, though described from an unknown locality, can be matched with specimens from British Guiana. It differs abundantly from *vittifrons* in the shape of the frons, in antennal proportions, and in colour pattern.

Ugyops nerinus sp. n.

(Text-figs. 18–23)

Vertex longer medially than broad at base (1·8 : 1) subangulately rounding into frons, rather wider at apex than at base, lateral margins straight, apical margin truncate with fused submedian carinae distinctly prominent, submedian carinae almost uniting at apex of vertex,



Figs. 18–23. *Ugyops nerinus* sp. n. 18, Frons and clypeus; 19, vertex and pronotum; 20, vertex and frons in profile; 21, first antennal segment; 22, second antennal segment; 23, tegmen.

forming a common eminence, basal compartment of vertex wider at hind margin than median length (1·4 : 1), frons in middle line longer than wide at widest part (2·8 : 1), widest at three-quarters from base, lateral margins shallowly convex, median carina simple in apical quarter, forked in basal three-quarters with the two carinae moderately widely separated, rostrum attaining post-trochanters, antennae reaching beyond apex of clypeus, basal segment almost cylindrical, longer than broad (9 : 1), second segment longer than first (1·3 : 1), ocelli obsolete ; post-tibiae laterally with three teeth.

Dilute testaceous ; small round spots adjoining lateral margins and median carinae of frons, on sides of head before eyes and on hind margin of pronotum, genae, coxae, post-femora ventrally, abdominal sternites and a broad band across each tergum, stramineous. Two broad bands on second antennal segment, margins of tibiae and tarsi, anal segment of female and third valvulae of ovipositor, fuscous ; membrane between abdominal terga sometimes red. Tegmina yellowish hyaline, costa ferruginous, veins castaneous, sparsely interrupted with stramineous ; all apical cells infuscate near apical margin, a suffusion extending from margin into subapical cells in *M*. Wings hyaline, shading into dilute fuscous distally, veins dark.

Anal segment of female rather short, in profile about twice as long as broad.

Female : length, 7·0 mm., tegmen, 7·5 mm.

Holotype ♀, NARCONDAM I.: B.M. 1906–204 (*G. Rogers*), B.M. (N.H.).

This species belongs to the *percheronii* group, large forms with the median frontal carina simple, at least in its distal portion. It differs from all in the shape of the head, relative proportions of the antennal segments, and in colour pattern.

***Ugyops nesiotes* sp. n.**

(Text-figs. 24–30)

Vertex longer medially than broad at base (2 : 1), broadly and strongly rounding into frons, distinctly wider at apex than at base, lateral margins straight, apical margin transverse, with fused submedian carinae moderately prominent, submedian carinae fused at apex of vertex, basal compartment of vertex about as wide at hind margin as median length, frons in middle line longer than wide at widest part (2·8 : 1), widest at two-thirds from base, lateral margins shallowly convex, submedian carinae moderately separated in basal half, narrowing in distal half and uniting at apex, or a very little before ; rostrum slightly surpassing post-trochanters ; antennae reaching to apex of clypeus, basal segment longer than broad at middle (7·5 : 1), second segment longer than first (1·5 : 1) ; ocelli represented only by a scar ; pronotum with lateral margins with only one distinct carina, a second carina very weakly present ; post-tibiae laterally with three teeth.

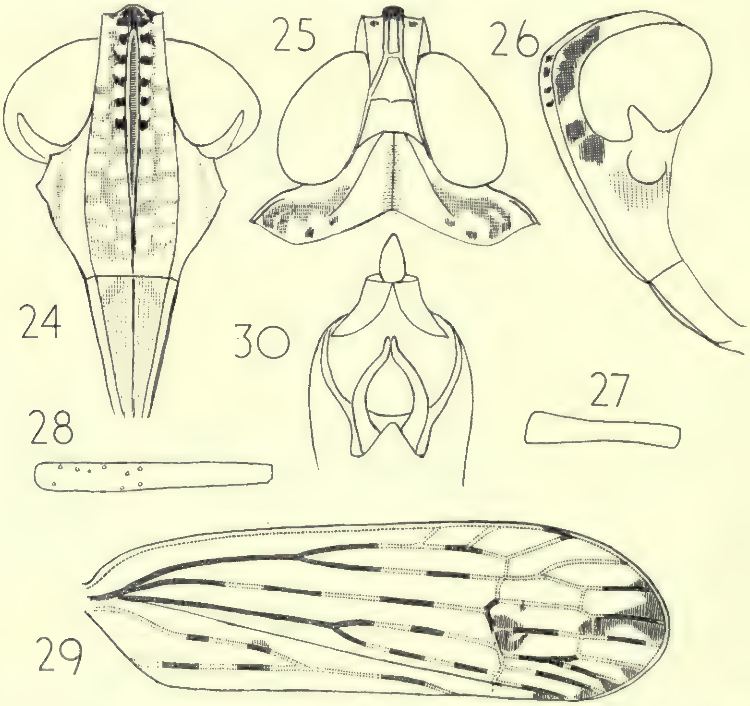
Stramineous, transverse bars on frons, two areas on side of head before and above eyes, two rings on second antennal segment, intermittent spots on posterior half and lateral lobes of pronotum, carinae and lateral fields of mesonotum, a band on femora apically, and three bands on protibiae and mesotibiae, pygofer basally and on medioventral process, lighter or darker fuscous, genae before antennae red. Tegmina milky hyaline, a suffusion in apical cells of *M* near margin, and a small spot overlying nodal line at *M*, and veins and margin distally interruptedly, fuscous. Wings hyaline, faintly infuscate distally, veins fuscous.

Anal segment of male with lower margins symmetrical. Pygofer with lower part of lateral margins simple, not inflected or produced in a process ; diaphragm with dorsal margin shallowly concave, medioventral process simple, deeply convex. Genital styles as figured.

Male : length, 6·0 mm., tegmen, 6·5 mm.

Holotype ♂, KRAKATAU : iv.1920, B.M. 1929–510, B.M. (N.H.).

In its general form and size this species is not unlike *U. notivena* Walker from Malacca (1851a : 88), but differs from Walker's type very markedly in the separate submedian frontal carinae (which unite at middle in *notivena*), antennal proportions and in colour pattern. From the Sumatran *intercepta* Walker it differs in the separate submedian carinae, and indeed in the shape of almost every bodily feature, and from *insularis* Muir (1926h : 398), from the Mentawi Islands, it differs entirely in colour pattern, *insularis* being characterized by three longitudinal fuscous lines on the frons and fuscous front and middle legs. The two species differ also in the structure of the male genitalia. The Christmas Island species *U. aristella* (Kirby) (1900a : 136) has a proportionately longer vertex than *nesiotes*, and the lateral margins of the frons are sinuate, not simply convex ; at each lateral margin of the pronotum there is one distinct carina and a second distinct for the anterior part of its length. This and the present species differ abundantly in colour pattern.



Figs. 24–30. *Ugyops nesiotes* sp. n. 24, Frons and clypeus ; 25, vertex and pronotum ; 26, head in profile ; 27, first antennal segment ; 28, second antennal segment ; 29, tegmen ; 30, posterior margin of pygofer, genital styles, and anal segment, postero-ventral view.

***Ugyops cantilena* sp. n.**

(Text-figs. 31–37)

Vertex longer medially than broad at base (2 : 1), in profile acutely rounding into frons, as wide at apex as at base, lateral margins straight, apical margin convex with submedian carinae moderately prominent, on a common eminence, submedian carinae fused or closely apposed at apex of vertex, basal compartment of vertex wider at hind margin than median length (1·1 : 1), frons in middle line longer than wide at widest part (3·2 : 1), widest at five-sixths from base, lateral margins straight in basal two-thirds, convex in distal third, median carina forked at two-thirds from base ; rostrum slightly surpassing post-trochanters ; antennae reaching beyond apex of clypeus, basal segment longer than broad at middle (7 : 1), second segment longer than first (1·7 : 1) ; ocelli distinct. Pronotum with lateral margins bicarinate ; post-tibiae laterally with three teeth.

Stramineous, intercarinal areas of frons and clypeus, a suffusion on coxae, pleura and legs, light reddish brown ; carinae and margins of head, some barring at base of frons and on sides of head before eyes, apex and intercarinal areas of vertex narrowly, median carina of pronotum and carinae of mesonotum, castaneous–piceous. Tegmina sordid milky hyaline,veins reddish brown, sparsely interrupted stramineous near nodal line, a band from posterior half of apical margin to Cu_1 at nodal line, fuscous. Wings hyaline, veins castaneous.

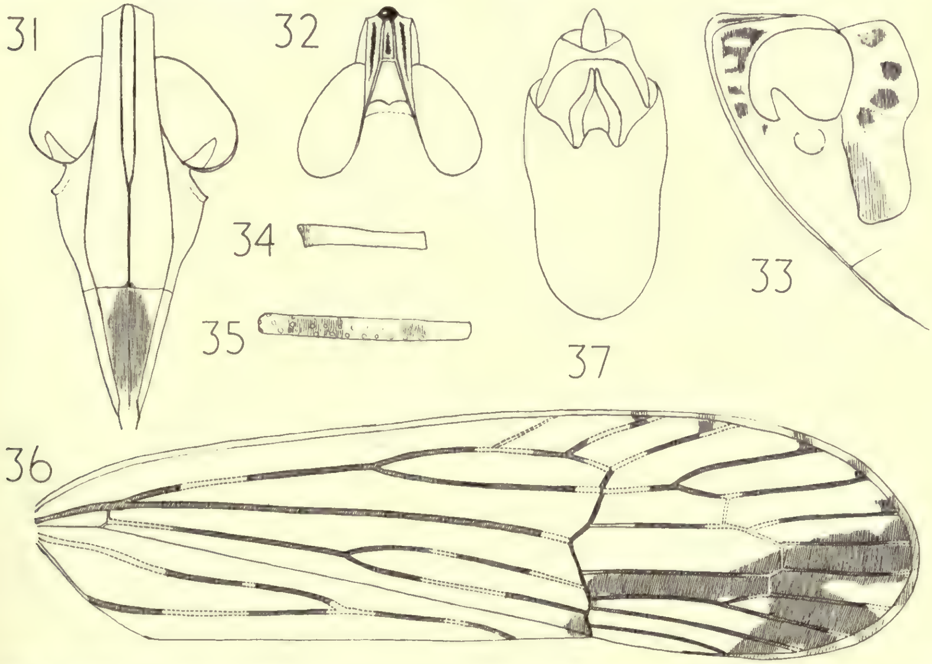
Anal segment of male symmetrical, lateroapical angles not produced. Pygofer long, posterior margins not inflected near medioventral process ; medioventral process well developed in form of an almost semicircular lobe. Genital styles as figured.

Male : length, 7·6 mm., tegmen, 9·8 mm.

Holotype ♂, THAILAND : Chant[abon], (*Mouhot*), [Reg. No.] 68.4 (1868, presented to B.M. (N.H.) by W. Wilson Saunders).

Paratype ♀, same data.

This species belongs to the *percheronii* group, and differs from *percheronii* itself in the more distal fork of the median carina of the frons and in the colour pattern of the tegmina. It is distinguished from other species of the group by the shape of the head, antennal proportions, structure of the male genitalia, and colour pattern.



FIGS. 31–37. *Ugyops cantilena* sp. n. 31, Frons and clypeus ; 32, head, dorsal view ; 33, head in profile ; 34, first antennal segment ; 35, second antennal segment ; 36, tegmen ; 37, pygofer, genital styles and anal segment, postero-ventral view.

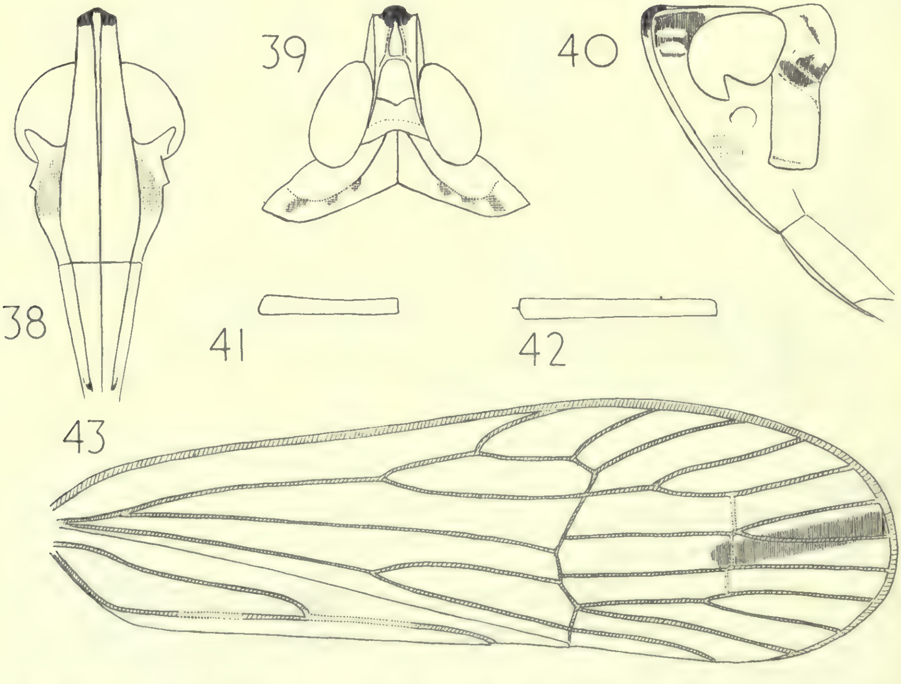
Ugyops macareis sp. n.
(Text-figs. 38–43)

Vertex longer medially than broad at base (2·25 : 1), subacutely rounding into frons, as wide at apex as at base, lateral margins straight, apical margin sinuately convex with submedian carinae broadly and distinctly prominent, submedian carinae fused and apposed at apex of vertex, basal compartment of vertex a little shorter at hind margin than median length (1 : 1·1), frons in middle line longer than wide at widest part (3 : 1), widest at three-quarters from base, lateral margins shallowly sinuate, convex distally, median carina simple in distal half, narrowly forked in basal half ; rostrum reaching to post-trochanters ; antennae reaching beyond apex of clypeus, basal segment longer than broad (8 : 1), second segment longer than first (nearly 1·5 : 1) ; ocelli obsolete. Pronotum with two carinae at each lateral margin. Post-tibiae laterally with three teeth.

Stramineous ; frons basally, except for indications of three spots, sides of head before eyes, except for two pustules, castaneous-piceous ; pronotum behind eyes, interruptedly, antennae, except basal segment basally, postfemora except dorsally, eighth and ninth abdominal sternites, and ovipositor, fuscous ; lateral fields of mesonotum, and tegulae, testaceous, middle line light testaceous. Tegmina slightly yellowish milky hyaline, a narrow fuscous band in *M* between subapical cross-veins and apex of tegmen, creamy, transverse veinlets of subapical series tawny yellow. Wings hyaline, veins fuscous.

Anal segment of female moderately long, in lateral view slightly more than twice as long as broad.

Female : length, 7·3 mm., tegmen, 9·2 mm.



Figs. 38–43. *Ugyops macareis* sp. n. 38, Frons and clypeus ; 39, vertex and pronotum ; 40, head in profile ; 41, first antennal segment ; 42, second antennal segment ; 43, tegmen.

Holotype ♀, THAILAND : Bukit Besar, [Reg. No.] 40, B.M. 1903–127, (*Annandale* and *Robinson*), B.M. (N.H.).

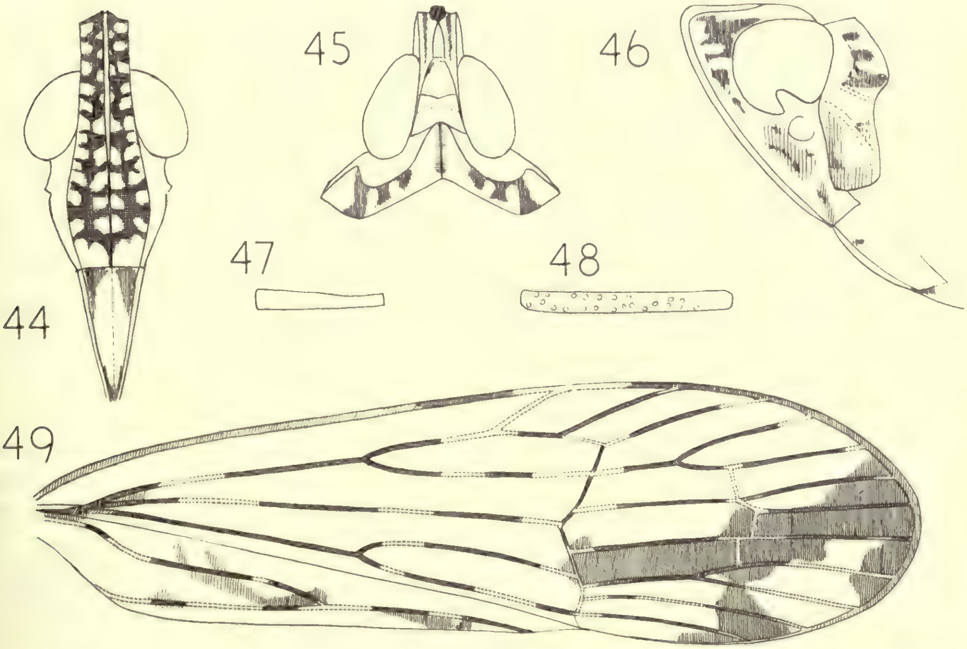
This species belongs to the *percheronii* group, and differs from all other species of this group in bodily proportions, colour pattern and apparently in the position of the union of the submedian carinae on the frons. In this feature it agrees with *U. percheronii*, but differs from this species in the presence of a fuscous band on the tegmina, which are immaculate in *U. percheronii*.

Ugyops cassander sp. n.

(Text-figs. 44–49)

Vertex longer medially than broad at base (2·3 : 1) acutely rounding into frons, as wide at apex as at base, lateral margins straight, apical margin transverse with submedian carinae strongly prominent, submedian carinae fused but not uniting at apex of vertex, basal compartment of vertex wider at hind margin than median length (1·2 : 1), frons in middle line longer than wide at widest part (3·1 : 1), widest at six-sevenths from base, lateral margins straight in basal half, convex distally, median carina simple in distal third, forked in basal two-thirds ; rostrum distinctly surpassing post-trochanters ; antennae reaching beyond apex of clypeus, basal segment longer than broad (6 : 1), second segment longer than first (1·8 : 1) ; ocelli absent. Pronotum with two carinae at each lateral margin.

Stramineous or ochraceous ; intercarinal areas of frons, except for four rows of distinct round spots, disc of clypeus laterobasally, intercarinal areas of vertex, sides of head above eyes,



FIGS. 44–49. *Ugyops cassander* sp. n. 44, Frons and clypeus ; 45, vertex and pronotum ; 46, head in profile ; 47, first antennal segment ; 48, second antennal segment ; 49, tegmen.

except for three round spots, posterior half of pronotum behind eyes, except for two round spots. procoxae and mesocoxae at base, two stripes on mesopleura, abdomen dorsally at apex, and ovipositor, fuscous. Sides of head before antennae, and lower margin of lateral pronotal lobes, red. Second antennal segment, protibiae and mesotibiae distally, and tarsi, dark testaceous. Tegmina yellowish milky hyaline, a narrow band from Cu_1 at nodal line to apical margin in M, and a more diffuse band from posterior transverse vein of subapical series to anal angle, fuscous ; veins dark castaneous, broadly interrupted with creamy yellow. Wings hyaline, veins fuscous. Anal segment of female moderately long, in lateral view fully twice as long as broad.

Female : length, 8·4 mm., tegmen, 10·0 mm.

Holotype ♀, BORNEO : Sar[awak], [Reg. No.] 57.36 (*Stevens*), B.M. (N.H.).

This specimen lacks the hind legs, but it is highly probable that in this species the post-tibiae are three-spined. In facial markings it bears a resemblance to *U. liturifrons* (Walker) from Gilolo, and in tegminal markings to *U. pictula* Walker, in a series of which it has stood in the Museum collection, but differs amply from both in other characters.

Ugyops odites sp. n.

(Text-figs. 50–55)

Vertex longer medially than broad at base (2·5 : 1), subacutely rounding into frons, as wide at apex as at base, lateral margins straight, apical margin shallowly convex, with submedian carinae slightly prominent, submedian carinae fused in a common eminence at apex of vertex, basal compartment of vertex shorter at hind margin than median length (1 : 1·1), frons in middle line longer than wide at widest part (3·1 : 1), widest at three-quarters from base, lateral margins convex, shallowly sinuate, median carina simple, thickened in basal three-quarters in a simple longitudinal eminence, devoid of any trace of median groove ; rostrum reaching post-trochanters ; antennae reaching much beyond apex of clypeus, basal segment longer than broad at middle (12 : 1), second segment longer than first (1·3 : 1) ; ocelli obsolete. Pronotum with lateral margins distinctly bicarinate. Post-tibiae laterally with three teeth.

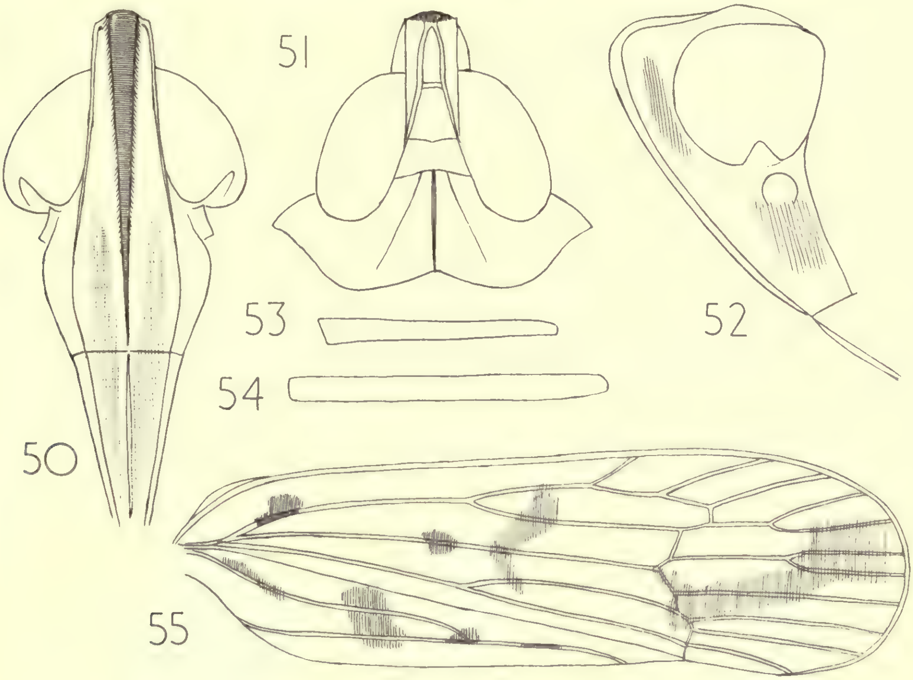
Testaceous or dilute ferruginous ; thickened basal portion of median carina, a longitudinal suffusion on each side of median carina of frons and clypeus, a suffusion on genae near base of antennae, second antennal segment, an oblique mark on lateral margins of pronotum overlying lateral carina, tibiae and tarsi, abdominal sternites and dorsum at margins, ferruginous-fuscous. Tegmina yellowish hyaline, veins light brown, sparsely interrupted stramineous just distad of middle ; an oblique interrupted suffusion from middle of costal margin to commissural margin one-quarter from base, and a suffusion in cells of M from apical margin to line of cross-veins, yellowish brown. Wings yellowish hyaline, a little darker apically, veins darker yellowish brown.

Female : length, 8·0 mm., tegmen 7·5 mm.

Holotype ♀, NEW GUINEA : Andai, B.M. 1903–31 (*W. Doherty*), B.M. (N.H.).

This species is a member of the *percheronii* group, but is distinguished by the broadly fused submedian carinae on the basal three-quarters of the frons, by the relative proportions of the antennal segments, and by the colour pattern. It bears a resemblance to *U. liturifrons* (Walker), (1870a : 119), the type of which is from Gilolo, but differs in the shape of the head in profile, and in the median carina of the frons, which in the present species consists basally of a broad thickened eminence, whereas in *liturifrons* it takes the form of two distinct carinae on an elevated ridge. In colour pattern of the frons the two species differ markedly, *liturifrons* having a regular pattern of four rows of small dark spots alternated with light spots.

From *U. flyensis* Schmidt (1930b : 12), to which it is probably fairly closely allied, it differs in the basally widened and thickened median frontal carina. In *U. flyensis*, this carina is described as being simple, percurrent and sharp, without any fork or groove. The two species differ also in details of coloration.



Figs. 50–55. *Ugyops odites* sp. n. 50, Frons and clypeus ; 51, vertex and pronotum ; 52, head in profile ; 53, first antennal segment ; 54, second antennal segment ; 55, tegmen.

Ugyops ocypetes sp. n.

(Text-figs. 56–61)

Vertex longer medially than broad at base (2·1 : 1), broadly subacutely rounding into frons, very slightly wider at apex than at base, lateral margins straight, apical margin truncate with submedian carinae not at all prominent, submedian carinae not uniting at apex of vertex, basal compartment of vertex as wide at hind margin as median length, frons in middle line longer than wide at widest part (nearly 2·8 : 1), widest at three-quarters from base, lateral margins sinuately convex, median carina simple in distal half, composed of forked submedian carinae on an elevated ridge in basal half ; rostrum reaching to second visible segment of abdomen ; antennae reaching beyond apex of clypeus, basal segment longer than broad at middle (7 : 1), second segment longer than first (2·1 : 1) ; ocelli distinct. Pronotum with two carinae laterally at margin. Post-tibiae laterally with three teeth.

Pale testaceous or sordid stramineous ; margins but not carinae of head and thorax, dark castaneous ; intercarinal areas of frons, a suffusion on sides of head near anterodorsal margin of eye, a line on each side of lower lateral pronotal carina and of median carina, median compartment of mesonotum, second antennal segment dilutely distally, suffused rings on all tibiae, abdominal sclerites in part, and genitalia in part, fuscous. Tegmina milky hyaline, veins more or less interruptedly fuscous ; sometimes a short vitta from apex to submarginal cross-veins in *M* with a branch to anal angle, an interrupted oblique fascia across middle of corium, and apex of clavus, suffused fuscous. Wings hyaline, shading into dilute fuscous near margin, veins fuscous.

Anal segment of female moderately short, twice as long as broad.

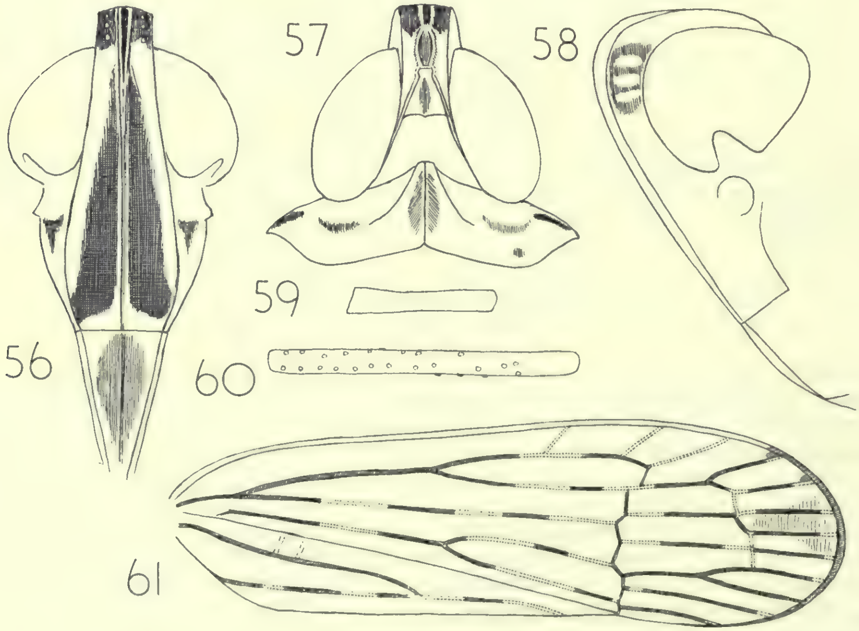
Male : length 6·5 mm., tegmen, 7·0 mm.

Female : length, 7·5 mm., tegmen, 8·0 mm.

Holotype ♀, New Hebrides : Banks I., Vanua Lava, ix–x.1929 (*L. E. Cheesman*), B.M. 1930–8, B.M. (N.H.).

Paratypes, 2 ♀ ♀, New Hebrides : same data ; Santo, 1 ♀, viii–ix.1929 (*L. E. Cheesman*), B.M. 1929–537.

The bolder tegminal markings described above are found only on the specimen from Santo I. This species is distinguished by the shape of the head, antennal proportions, structure of the male genitalia and colour pattern. From *U. buxtoni* Muir (1931b : 71), the only other New Hebridean species with which it might be confused, it is distinguished by the shape of the frons and by the broad infuscation of the intercarinal areas of the frons. In *U. buxtoni* only a narrow longitudinal fuscous line is developed in each compartment of the frons. The two species are sympatric on Banks I.



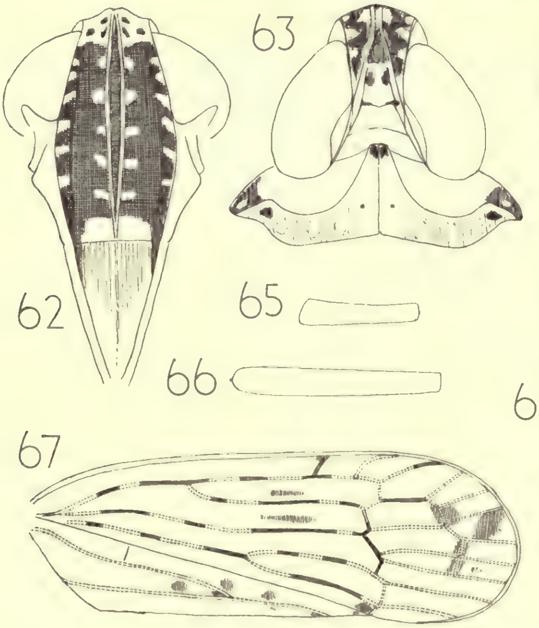
Figs. 56–61. *Ugyops ocypetes* sp. n. 56, Frons and clypeus ; 57, vertex and pronotum ; 58, head in profile ; 59, first antennal segment ; 60, second antennal segment ; 61, tegmen.

***Ugyops cheesmanae* sp. n.**
(Text-figs. 62–68)

Vertex longer medially than broad at base (1·8 : 1), broadly subrectangulately rounding into frons, distinctly wider at apex than at base, lateral margins straight, apical margin convex with submedian carinae not or scarcely prominent, submedian carinae closely apposed at apex of vertex, basal compartment of vertex wider at hind margin than median length (nearly 1·4 : 1), frons in middle line longer than wide at widest part (2 : 1), widest at four-sevenths from base, lateral margins convex, submedian carinae moderately widely separated, meeting at apex ; rostrum reaching to level of second visible abdominal sternite ; antennae reaching slightly beyond apex of clypeus, basal segment longer than broad at middle (nearly 6 : 1), second segment longer than first (1·7 : 1) ; ocelli represented only by a scar. Pronotum with only one distinct carina at lateral margins, with traces of a second emphasised by a pale line. Post-tibiae laterally with three teeth.

Stramineous ; heavy oblique barring on frons and vertex, suffusions on genae before antennae and eyes and above eyes, small spots anteriorly and posteriorly on pronotal disc, and an extensive suffusion on lateral lobes, mesopleura, bands on femora subapically and two bands on tibiae, fuscous-piceous ; small sublinear marks on mesonotum sublaterally, disc of clypeus, bands on each tarsal segment, castaneous-fuscous. Antennae sometimes distinctly tinged with pale green. Tegmina milky hyaline, two small marks distally in subapical cells of *M*, fuscous, veins concolorous, sparsely and regularly interrupted with castaneous brown. Wings milky hyaline, with fuscous veins.

Anal segment of male asymmetrical, with lateroapical angle of left side produced more strongly ventrad in a rounded lobe. Pygofer with posterior margins convex, shallowly indented near medioventral process ; medioventral process subquadrate, moderately produced



FIGS. 62–68. *Ugyops cheesmanae* sp. n. 62, Frons and clypeus ; 63, vertex and pronotum ; 64, head in profile ; 65, first antennal segment ; 66, second antennal segment ; 67, tegmen ; 68, anal segment, posterior margin of pygofer, and genital styles, posterior view.

caudad, distal margin truncate, in posterior view shallowly trough-like. Genital styles as figured.

Anal segment of female in profile about twice as long as broad.

Male : (coelopterous) length, 5·5 mm., tegmen, 4·9 mm.

Female : (coelopterous) length, 6·2 mm., tegmen, 5·6 mm.

Holotype ♂, NEW HEBRIDES : Malekula, i.1930 (*L. E. Cheesman*), B.M. 1930–135, B.M. (N.H.).

Paratypes, same data, 2 ♀♀.

This species superficially is not unlike the sympatric *U. sulcatus* Muir (1931b : 70), but differs in the consistently much darker frons, without the bold pattern of subcontiguous round spots found in *sulcatus*, in antennal proportions, structure of the male genitalia and in tegminal markings. The feature which perhaps most readily separates the two is the coloration of the lateral lobes of the pronotum : in *U. sulcatus* these are mostly stramineous or ochraceous, with only a little fuscous interpustular marking, as contrasted with the striking pattern of pallid marks on a dark ground shown in the figure of *cheesmanae*.

This species is dedicated to Miss L. E. Cheesman, whose collections in the south-west Pacific have contributed much to our knowledge of the insect fauna of this area.

Ugyops orestilla sp. n.

(Text-figs. 69–76)

Vertex longer medially than broad at base (1·3 : 1), obtusely rounding into frons, slightly narrower at apex than at base, lateral margins shallowly concave, almost straight, apical margin biconcave with submedian carinae separate and prominent, submedian carinae parallel and not uniting at apex of vertex, basal compartment of vertex wider at hind margin than median length (2 : 1), frons in middle line longer than wide at widest part (nearly 2·3 : 1), widest at three-quarters from base, lateral margins straight in basal half, convex in distal half, submedian carinae very shallowly arcuate, separate to apex ; rostrum reaching to level of middle of pygofer ; antennae scarcely reaching to apex of clypeus, basal segment longer than broad at middle (4·5 : 1), second segment longer than first (1·2 : 1) ; ocelli absent. Pronotum with only one distinct carina at lateral margins. Wings absent. Post-tibiae laterally with three teeth.

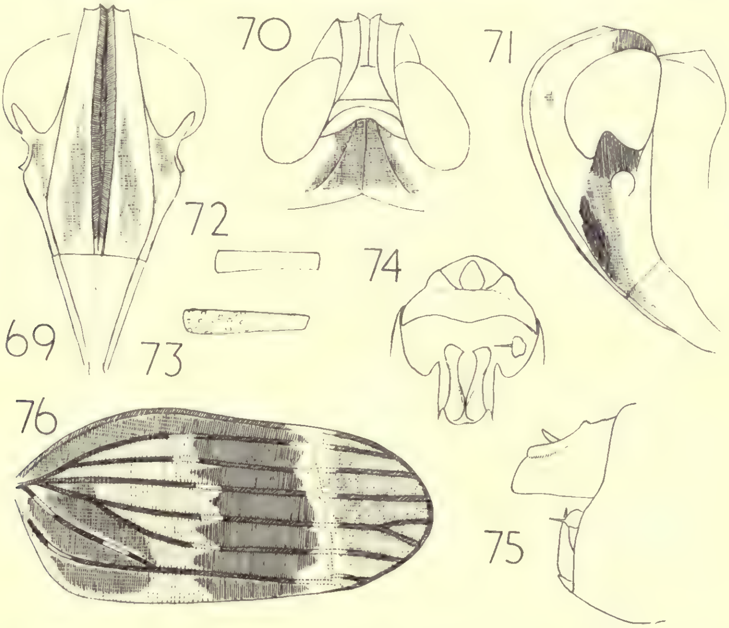
Stramineous ; frons between submedian carinae, hind margin of vertex behind eyes, posterior part of pronotal disc, median carina and posterolateral margins of mesonotum, red ; carinae and margins of head and thorax, second antennal segment, an oblique stripe on genae before antennae, a suffusion medially on pronotum, procoxae, mesopleura and metapleura, femora distally, two diffuse bands on protibiae and mesotibiae, abdomen dorsally and ventrally, and genitalia, fuscous. Tegmina dilute brownish hyaline, a suffusion in clavus basally and a broad band across tegmen just basad of transverse line of cross-veins, dark castaneous, veins on each side of this band, creamy white, elsewhere concolorous or overlain with brown.

Anal segment of male with ventral margins straight, horizontal, lateroapical angles not produced. Pygofer with posterior margin on each side produced dorsad in a short rather narrowly acute lobe, medioventral process moderately produced caudad, trough-like in posterior view. Genital styles shallowly sinuate, rounded-truncate apically, with inner angle acute.

Male (coelopterous) : length, 5·1 mm., tegmen, 3·8 mm.

Holotype ♂, NEW HEBRIDES : Malekula, i.1930 (*L. E. Cheesman*), B.M. 1930–178, B.M. (N.H.).

This species is closely allied to *U. brevipennis* Muir from Tutuila (Samoa), and the two apparently occupy an isolated position, and can readily be distinguished from all known species by the form of the head, the great length of the rostrum, or the structure and coloration of the tegmina. From one another they can be separated by the relative length of the antennal segments, the second segment in *U. brevipennis* exceeding the first in the ratio 1·1 : 1, and the basal segment being relatively more slender, the ratio of length to width at middle being 6 : 1. Moreover in *U. brevipennis* the lateral margins of the frons (in anterior view) are more strongly incurved to the frontoclypeal suture. The two species differ also in the profile of the head.



Figs. 69–76. *Ugyops orestilla* sp. n. 69, Frons and clypeus ; 70, vertex and disc of pronotum ; 71, head in profile ; 72, first antennal segment ; 73, second antennal segment ; 74, posterior margin of pygofer, anal segment, genital styles, and apex of aedeagus, posterior view ; 75, male genitalia, right side ; 76, tegmen.

Ugyops arignotus sp. n.

(Text-figs. 77–84)

Vertex longer medially than broad at base (2·2 : 1), broadly and subacutely rounding into frons, distinctly wider at apex than at base, lateral margins straight, apical margin strongly convex with submedian carinae not at all prominent, submedian carinae closely apposed at apex of vertex, basal compartment of vertex wider at hind margin than median length (1·2 : 1), frons in middle line longer than wide at widest part (nearly 2·2 : 1), widest at two-thirds from base, lateral margins convex, submedian carinae moderately widely separated for five-sixths of their total length, united, or apparently so, in their distal sixth ; rostrum attaining post-trochanters ; antennae reaching to apex of clypeus, basal segment longer than broad at middle (nearly 6 : 1), second segment longer than first (nearly 1·7 : 1) ; ocelli obsolete. Pronotum with a single carina at lateral margins. Post-tibiae laterally with three teeth.

Stramineous ; an incomplete fascia across frons three-quarters from base, some spots and zig-zag marks at base of frons and on apex of vertex, a spot on side of head before eyes, and a few interpustular marks on pronotum laterally, fuscous-piceous ; carinae of pronotum and mesonotum, second antennal segment distally, rings on femora and tibiae, light brown ; abdominal terga and sternites, mostly fuscous, with paler spots. Tegmina milky-yellowish hyaline, veins concolorous, the longitudinal veins in greater part overlain with light reddish brown.

Anal segment of male asymmetrical, lateroapical angle of left side more strongly produced ventrad in a shallow rounded lobe. Pygofer moderately long, posterior margins inflected mesad near medioventral process ; medioventral process shallowly produced caudad, distally sinuate-truncate, in posterior view shallowly trough-like. Genital styles as figured.

Anal segment of female moderately short, about twice as long as broad.

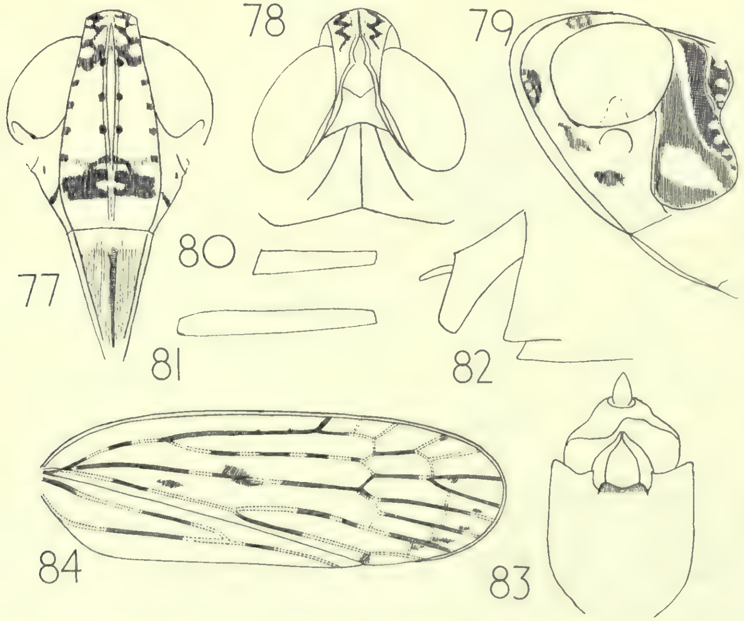
Male (coelopterous) : length, 5·3 mm., tegmen, 5·2 mm.

Female (coelopterous) : length, 7·0 mm., tegmen, 5·9 mm.

Holotype ♂, New Hebrides : Malekula, Ounua, iii–iv.1929 (*L. E. Cheesman*), B.M. 1929–343, B.M. (N.H.).

Paratypes, 1 ♂, 2 ♀♀, same data.

This species is a member of the *annulipes* group, and is distinguished by the shape of the head, the antennal proportions, structure of the male genitalia and colour pattern. The last serves to distinguish it almost at a glance from *U. sulcatus* and *U. cheesmanae*.



Figs. 77–84. *Ugyops arignotus* sp. n. 77, Frons and clypeus ; 78, vertex and disc of pronotum ; 79, head in profile ; 80, first antennal segment ; 81, second antennal segment ; 82, anal segment of male and posterior margin of pygofer, lateral view ; 83, pygofer, genital styles and anal segment, postero-ventral view ; 84, tegmen.

Ugyops pygmaeus **sp. n.**
(Text-figs. 85–92)

Vertex longer medially than broad at base (2·2 : 1), broadly and subacutely rounding into frons, much wider at apex than at base, lateral margins straight, apical margin strongly convex, with submedian carinae moderately prominent on a common eminence, submedian carinae not uniting on vertex, basal compartment of vertex narrower at hind margin than median length (1 : 1·2), frons in middle line longer than wide at widest part (about 2·2 : 1), widest at three-quarters from base, lateral margins convex, submedian carinae relatively widely separated, arcuate, meeting at apex, where they are a little obscure. Rostrum reaching to post-trochanters ; antennae reaching to apex of clypeus, basal segment longer than broad (5·3 : 1), second segment longer than first (1·6 : 1) ; ocelli obsolete. Pronotum with a single carina at lateral margins. Wings absent. Post-tibiae laterally with three teeth.

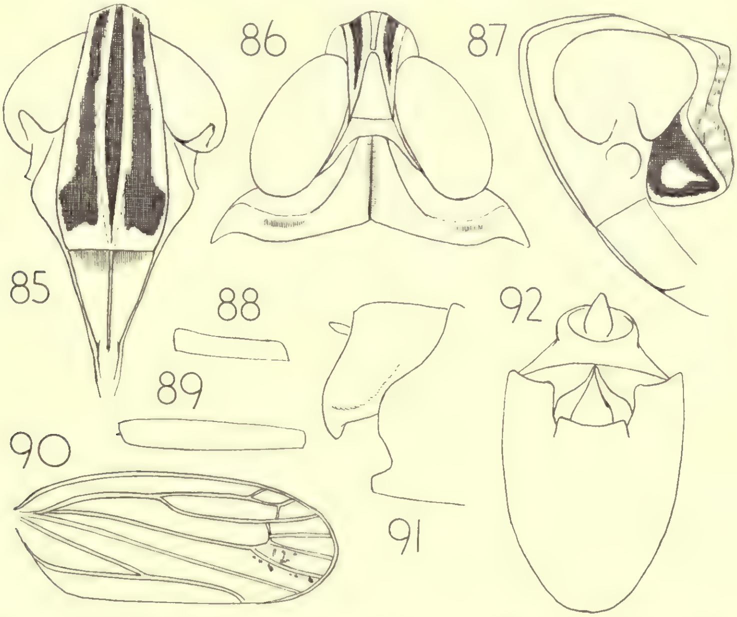
Ochraceous or very pale testaceous ; intercarinal areas of vertex and frons, and a suboval ring on each lateral pronotal lobe, fuscous-piceous ; intercarinal areas of pronotal disc and of mesonotum, clypeus except in middle line, coxae and pleura, diffuse rings on femora and tibiae, testaceous or dilute fuscous. Tegmina yellowish hyaline, veins light ochraceous, sometimes faintly overlain with light brown.

Anal segment of male relatively large, not produced at lateroapical angles ; pygofer with posterior margins moderately inflected near medioventral process ; medioventral process rather broad, distal margin entire, shallowly trough-like in posterior view ; genital styles as figured.

Anal segment of female short, in side view not twice as long as broad.

Male (coelopterous) : length, 3·6 mm., tegmen, 3·2 mm.

Female (coelopterous) : length, 4·9 mm., tegmen, 3·6 mm.



FIGS. 85–92. *Ugyops pygmaeus* sp. n. 85, Frons and clypeus ; 86, vertex and pronotum ; 87, head in profile ; 88, first antennal segment ; 89, second antennal segment ; 90, tegmen ; 91, posterior part of pygofer, and anal segment of male, right side ; 92, pygofer, genital styles and anal segment, postero-ventral view.

Holotype ♂, New Hebrides : Malekula, Malua Bay (*L. E. Cheesman*), B.M. 1929–40, B.M. (N.H.).

Paratypes, 1 ♂, same data ; Atchin I., 2 ♂ ♂, 2 ♀ ♀, v.1929 (*L. E. Cheesman*), B.M. 1929–410.

This species is quite unmistakable on account of its diminutive size. Apart from this it shows some affinity with members of the *annulipes* group, but is distinguished from all by the shape of the head, the antennal proportions, and the structure of the male genitalia.

Ugyops orchamus sp. n.

(Text-figs. 93–99)

Vertex longer medially than broad at base (2 : 1), subrectangulately rounding into frons, distinctly wider at apex than at base, lateral margins straight, apical margin strongly convex with submedian carinae only weakly prominent, submedian carinae contiguous but not uniting at apex of vertex, basal compartment of vertex wider at hind margin than median length (1·2 : 1), frons in middle line longer than wide at widest part (nearly 1·8 : 1), widest at two-thirds from base, lateral margins convex, submedian carinae widely separated at middle, united at base and at apex ; rostrum reaching to post-trochanters ; antennae reaching to apex of clypeus, basal segment longer than broad at middle (4·4 : 1), second segment longer than first (1·9 : 1) ; ocelli represented only by a scar. Pronotum with a single carina at lateral margins. Post-tibiae laterally with three teeth.

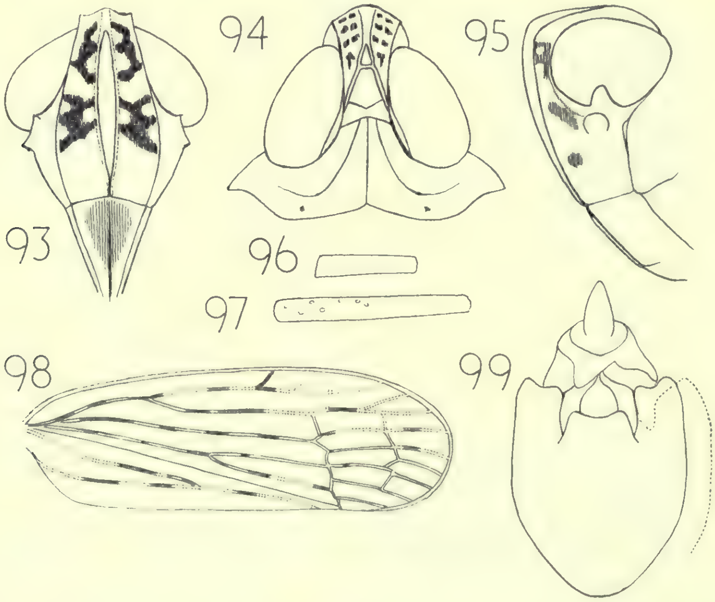


Fig. 93–99. *Ugyops orchamus* sp. n. 93, Frons and clypeus ; 94, vertex and pronotum ; 95, head in profile ; 96, first antennal segment ; 97, second antennal segment ; 98, tegmen ; 99, anal segment, pygofer and genital styles, postero-ventral view, with margin of pygofer of *U. orchamus jugis* subsp. n. shown displaced to right, in broken line.

Stramineous ; transverse barring on basal quarter and third quarter of frons, before antennae and in front of eyes, two bands on second antennal segment, an oblique stripe on lateral lobes of pronotum, two marks on mesopleura, a ring subapically on all femora, three rings on protibiae and mesotibiae and two rings on post–tibiae, and a ring on each tarsal segment, some marks on abdominal terga and on medioventral process of pygofer, castaneous-fuscous. Tegmina milky hyaline, veins stramineous, regularly interrupted with reddish brown. Wings hyaline, veins stramineous.

Anal segment of male asymmetrical, lower margin of left side widely excavate, lateroapical angle of left side produced in a quadrate lobe extending farther ventrad than that on right. Pygofer moderately long, posterior margins shallowly sinuate, inflected near medioventral process but not produced ; medioventral process distally truncate, concave, shallowly trough-like in posterior view. Genital styles as figured.

Male : length, 5·3 mm., tegmen, 4·6 mm.

Female : length, 7·0 mm., tegmen 5·6 mm.

Holotype ♂, NEW HEBRIDES : Erromanga, viii.1930 (*L. E. Cheesman*), B.M. 1930–496, B.M. (N.H.).

Paratype, 1 ♀, same data.

This species belongs to the *annulipes* group and is distinguished by the relatively wide separation of the submedian frontal carinae, by antennal proportions and structure of the male genitalia.

Ugyops orchamus jugis **subsp. n.**

(Text-fig. 99)

Head in profile with dorsal margin not angulate. Lateral margin of pygofer, as seen in lateral view, not excavate at middle.

Holotype ♂ of subspecies, NEW HEBRIDES : Malekula, i.1930 (*L. E. Cheesman*) B.M. 1930–178, B.M. (N.H.).

Paratypes, ♂, same data ; Tanua, 1 ♂, ix.1930 (*L. E. Cheesman*), B.M. 1931–30.

This subspecies is distinguished from the typical subspecies by the upper margin of the head, as seen in profile, smoothly following the upper margin of the eye, without the trace of an angle above the eye, and by the entire lateral margin of the pygofer, which is distinctly excavate in the typical form.

Ugyops atreces **sp. n.**

(Text-figs. 100–106)

Vertex longer medially than broad at base (2 : 1), broadly subacutely rounding into frons, distinctly wider at apex than at base, lateral margins straight, apical margin convex with median carina not prominent, submedian carinae uniting at apex of vertex, basal compartment of vertex wider at hind margin than median length (1·2 : 1), frons in middle line longer than wide at widest part (2 : 1), widest at three-quarters from base, lateral margins convex, submedian carinae moderately widely separate, obscurely uniting at apex ; rostrum attaining post-trochanters ; antennae much surpassing apex of clypeus, basal segment flattened dorsally, longer than broad at middle (about 5 : 1), second segment longer than first (1·8 : 1) ; ocelli obsolete. Pronotum with two carinae laterally, the lower about twice as long as the upper. Post-tibiae laterally with three teeth.

Stramineous : some small spots adjoining lateral margins and submedian carinae of frons, and a spot on genae before base of antennae, red ; an irregular transverse fascia on frons subapically, some transverse barring at base, spots on side of head before and above eyes and on hind margin of pronotum, a line bordering lower side of lower lateral pronotal carina, and four small spots on mesonotal disc, fuscous-piceous. Tegmina yellowish hyaline, a small spot on M_{1a} at apical margin, a linear interruption on all veins between level of *Cu* fork and node, claval veins near their junction and Cu_{1b} at claval apex, fuscous. Wings hyaline, veins concolorous.

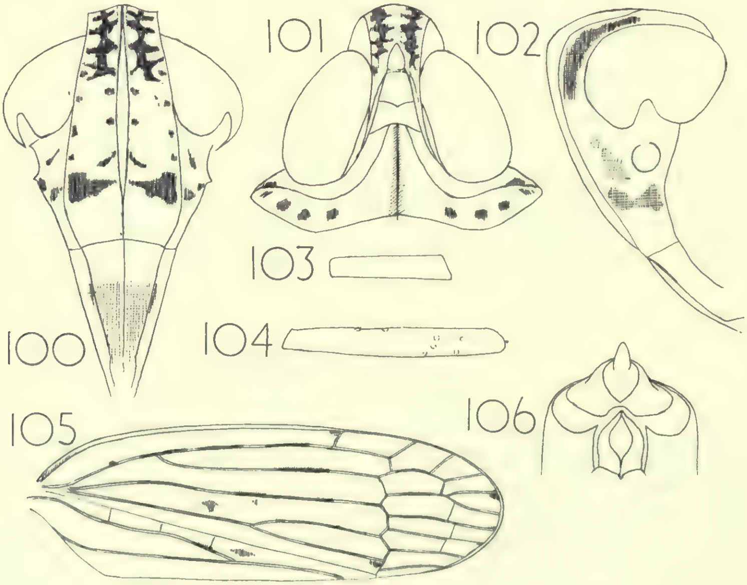
Anal segment of male symmetrical, lateroapical angles only very slightly produced ventrad, middle of apical margin with a shallow notch. Pygofer long, posterior margins strongly inflected just above medioventral process ; medioventral process weakly developed, apical margin truncate, in posterior view very shallowly v-shaped. Genital styles as figured.

Male : length, 6·0 mm., tegmen, 5·3 mm.

Holotype ♂, New Caledonia : Nouméa, xi.1954 (*L. E. Cheesman*), B.M. 1955–217, B.M. (N.H.).

Paratype, 1 ♂, same data.

This species belongs to the *annulipes* group, and of this the geographically nearest known member is *U. butleri* Muir (1925d : 221) from Netché, Maré. From this the present species differs in the pattern of marking on the frons, which in *butleri* consists of four narrow longitudinal fuscous stripes, two overlying the submedian carinae, which are separate and parallel, and two occupying the disc between the submedian carinae and the lateral margins. In the type specimen of *U. butleri*, the only one available for study, the post-tibiae are only two-spined laterally.



Figs. 100–106. *Ugyops atreces* sp. n. 100, Frons and clypeus ; 101, vertex and pronotum ; 102, head in profile ; 103, first antennal segment ; 104, second antennal segment ; 105, tegmen ; 106, posterior margin of pygofer, genital styles and anal segment, postero-ventral view.

Ugyops taranis sp. n.

(Text-figs. 107–112)

Vertex longer medially than broad at base (1·25 : 1), obtusely rounding into frons, as wide at apex as at base, lateral margins straight, apical margin transverse with fused submedian carinae moderately prominent, submedian carinae not uniting at apex of vertex but fused in a common eminence, basal compartment of vertex wider at hind margin than median length (1·6 : 1), frons in middle line longer than wide at widest part (2·6 : 1), widest at two-thirds from base, lateral margins convex, median carina simple, a little thickened in basal half, rostrum much surpassing post-trochanters, extending to level of middle of abdomen ; antennae reaching beyond apex of clypeus, basal segment longer than broad at middle (7 : 1), second segment longer than first (1·3 : 1) ; ocelli obsolete. Pronotum with lateral margins unicarinate, with faint traces of a second carina. Post-tibiae laterally with three teeth.

Stramineous ; margins of frons and clypeus interruptedly, carinae of vertex, pronotum and mesonotum in middle line and abdominal membranes, red ; two suffusions distally on frons, between carinae, and medially at base, suffusions on genae before antennae and above eyes, anteclypeus, two bands on second antennal segment, procoxae, most of lateral lobes of pronotum, mesopleura, postfemora basally, abdomen except dorsally in middle line and anterolaterally on sternites, castaneous ; mesocoxae distally, metacoxae and legs, dilute castaneous-fuscous. Tegmina brownish hyaline, main veins interruptedly, and cross veins, pallid ; some small spots in corium, and a larger mark near apical angle, fuscous.

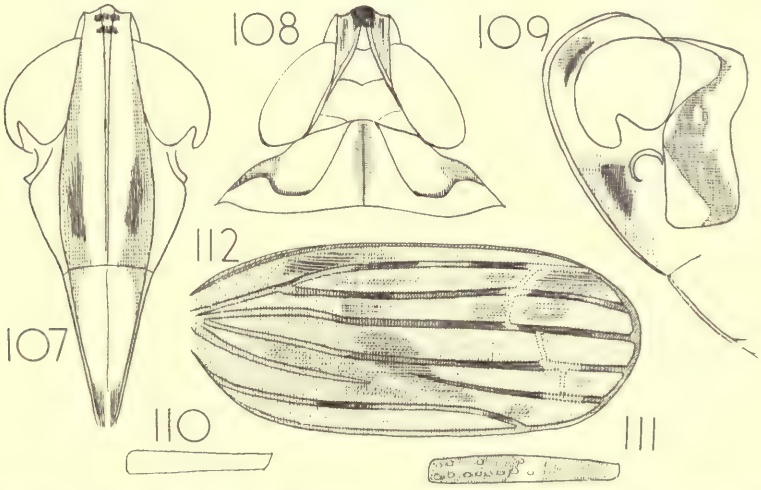
Anal segment of female short, in lateral view little longer than broad.

Female (coelopterous) : length, 6·0 mm., tegmen, 4·1 mm.

Holotype ♀, New Caledonia : Bourail, xii.1930 (*L. E. Cheesman*), B.M. 1931–123, B.M. (N.H.).

Paratype, 1 ♀, same data.

This species slightly resembles the coelopterous *houadouensis* Dist. (1920f : 469) and *inermis* Dist. (1920f : 468), but differs from both in its laterally trispinose



Figs. 107–112. *Ugyops taranis* sp. n. 107, Frons and clypeus ; 108, vertex and pronotum ; 109, head in profile ; 110, first antennal segment ; 111, second antennal segment ; 112, tegmen.

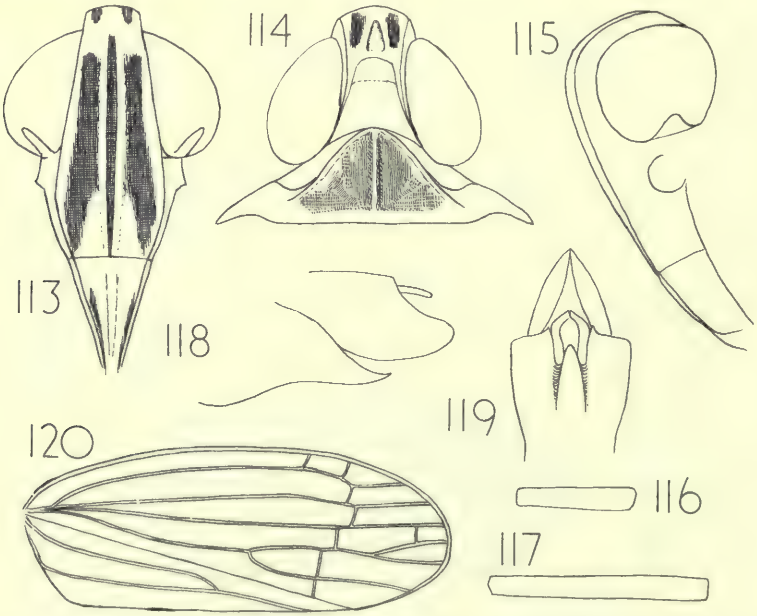
post-tibiae : the others have laterally bispinose post-tibiae with the basal spine very weak. In addition, the present species is distinguished by the shape of the frons and the antennal proportions. In all three species wings are apparently absent.

Ugyops menelaus sp. n.

(Text-figs. 113–120)

Vertex longer medially than broad at base (1·2 : 1), broadly rounding into frons, rather wider at apex than at base, lateral margins straight, apical margin convex with submedian carinae not at all prominent, submedian carinae not uniting at apex of vertex, obscure, apposed, basal compartment of vertex wider at hind margin than median length (1·6 : 1), frons in middle line longer than wide at widest part (2 : 1), widest at three-quarters from base, lateral margins straight in basal half, shallowly convex in distal half, submedian carinae separate to apex ; rostrum distinctly surpassing post-trochanters ; antennae reaching beyond apex of clypeus, basal segment longer than broad (4·5 : 1), second segment longer than first (nearly 1·8 : 1), ocelli absent. Pronotum with only one carina at lateral margin ; post-tibiae laterally with only two teeth ; the basal tooth very small. Tegmina not covering anal segment of male. Wings a little shorter.

Tawny yellow suffused with orange ; two ovate spots on vertex, three longitudinal vittae on frons, disc of pronotum, disc of mesonotum except in middle line, castaneous-piceous ; second segment of antennae, a suffusion along post-femora, pleura, abdomen dorsally, anal segment, and pygofer basally, fuscous or lighter castaneous. Tegmina brownish hyaline, veins tawny or orange yellow.



Figs. 113–120. *Ugyops menelaus* sp. n. 113, Frons and clypeus ; 114, vertex and pronotum ; 115, head in profile ; 116, first antennal segment ; 117, second antennal segment ; 118, distal part of pygofer, and anal segment, lateral view ; 119, anal segment, posterior part of pygofer, and genital styles, ventral view ; 120, tegmen.

Anal segment of male relatively large, steeply tectiform, in profile rather narrowly rounded at apex. Pygofer short dorsally, moderately long ventrally, posterior margin, in lateral view, sinuate and strongly oblique, sides of pygofer strongly longitudinally impressed on each side near medioventral process, the hind margin being narrowly produced caudad in an acute process ; diaphragm narrow, with dorsal margin transverse, or weakly sinuate ; medioventral process very deeply convex. Genital styles rather long, slender, in basal half moderately diverging distad, in distal half strongly incurved to meet in middle line, thence contiguously extending caudad.

Male : length, 5·3 mm., tegmen, 4·0 mm.

Holotype ♂, NEW CALEDONIA : Canala, 1.vii.1914 (*P. D. Montague*), B.M. 1927–89, B.M. (N.H.).

The number of teeth laterally on the post-tibiae alone would suggest a close affinity between this species and *U. inermis* Dist. and *U. houadouensis* Dist., and indeed they are closely similar in most respects, and undoubtedly form a natural group. All are known only from New Caledonia. The present species is nearer to *U. inermis* in the form of the frons, but this is relatively narrower than in *inermis*. The feature that readily sets *U. menelaus* apart from the others is the relatively much longer second antennal segment. This species also differs appreciably in the colour pattern of the frons. The three species are known only from the respective male holotypes. The male genitalia have not been dissected, but it was evident from superficial examination that those of *U. menelaus* differ from those of the others in the detailed shape of the margin of the pygofer, as well as in the profile of the apex of the anal segment.

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THE BLOW FLIES (DIPTERA : CALLIPHORIDAE)

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BY

D. ELMO HARDY
Department of Entomology, University of Hawaii

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MAURICE T. JAMES
Washington State University, Pullman, Washington, U.S.A.

Pp. 145–179 ; 41 *Text-figures*

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TRUSTEES OF
THE BRITISH MUSEUM (NATURAL HISTORY)

Issued 27 July, 1964 *Price Fourteen Shillings*

THE FRUIT FLIES (DIPTERA: TEPHRITIDAE) *

By D. ELMO HARDY

SYNOPSIS

Only twenty specimens of Tephritidae were collected by the British Museum (Natural History) Expedition to East Nepal, 1961–62. This small group, however, contained four subfamilies, six tribes, nine genera, and eleven species ; six of the species are apparently undescribed.

THIS collection is a most important one since it represents the first information we have concerning the fruit fly fauna of this little known region and I am most grateful to R. L. Coe and the British Museum (Nat. Hist.) for having had the privilege of studying this interesting material. For the art work I am indebted to Mrs. Elizabeth Twigg-Smith Pfeffer.

TAXONOMIC ARRANGEMENT OF THE TEPHRITIDAE IN THE COLLECTION

- Subfamily Dacinae
  - Tribe Dacini
    - *Callantra nepalensis* sp. n.
- Subfamily Aciurinae
  - Tribe Aciurini
    - *Oxyaciura monochaeta* (Bezzi)
  - Tribe Tephrellini
    - *Platensina zodiacalis* (Bezzi)
- Subfamily Trypetinae
  - Tribe Gastrozonini
    - *Taeniostola limbata* Hendel
  - Tribe Trypetini
    - *Chetostoma interrupta* sp. n.
    - *Rhagoletis rumpomaculata* sp. n.
- Subfamily Tephritinae
  - Tribe Tephritini
    - *Actinoptera* sp. n., being described by Ito
    - *Stylia sororcula* (Wiedemann)
    - *Tephritis coei* sp. n.
    - *T. daedala* sp. n.
    - *T. spiloptera* Bezzi

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* Published with the approval of the Director of the University of Hawaii Agricultural Experiment Station as Technical Paper No. 643.

Key to Tephritidae from Nepal in the British Museum Expedition Collection

1 Chaetotaxy normal, with the usual complement of head and thoracic bristles. Antennae not elongated ; abdomen not petiolate 2

– Ocellar, postocellar, dorsocentral, presutural, humeral, and sterno-pleural bristles lacking. Antennae elongate (Text-fig. 1) ; abdomen petiolate (Text-fig. 4) ; wasp-like flies. Subfamily Dacinae . . . . . ***Callantra nepalensis*** sp. n

2 Occipital hairs and postocellar bristles thin, pointed and brown to black in colour. Microchaetae of mesonotum not scale-like. Wings banded with brown (Text-figs. 13, 21 and 26), or predominantly black with hyaline wedges extending from the costal margin into cell R_1 and also with hyaline marks along the posterior margin (Text-fig. 7) 3

– Occipital row with at least some yellow-white scale-like setae ; postocellar bristles yellow-white and flattened. Mesonotum covered with scale-like setae. Wings variously spotted 6

3 Arista short-pubescent. Thorax predominantly or entirely black . . . 4

– Arista plumose (Text-fig. 12). Thorax yellow with four black vittae extending down mesonotum (Text-fig. 14). Wings as in Text-fig. 13. Subfamily Trypetinae, Tribe Gastrozonini . . . . ***Taeniostola limbata*** Hendel

4 Wings banded with brown (Text-figs. 21 and 26). Scutellum with four bristles. Subfamily Trypetinae, Tribe Trypetini 5

– Wings black with hyaline markings along costal margin and a round hyaline spot in cell R_5 (Text-fig. 7). Only two scutellar bristles. Female ovipositor very elongate (Text-fig. 9). Subfamily Aciurinae, Tribe Aciurini . ***Oxyaciura monochaeta*** (Bezzi)

5 Each gena with a dense clump of black bristles (Text-fig. 18). Vein R_{4+5} setose to beyond the *r-m* cross-vein. A complete brown band extends across the wing at a level with the *m* cross-vein (Text-fig. 21) . . ***Chetostoma interrupta*** sp. n.

– Genae rather sparsely setose. Vein R_{4+5} with only two setae at the base. Wing with no such cross-band and marked as in Text-fig. 26 ***Rhagoletis rumpomaculata*** sp. n.

6 Abdomen densely gray-pollinose and covered with yellow-white, scale-like hairs. Anterior dorsocentral bristles situated distinctly anterior to the supra-alar bristles, usually near the suture. Wings 2·6-2·8 times longer than wide, spotted or marked with brown as in Text-figs. 28, 31, 34, 36 and 38. Subfamily Tephritinae, Tribe Tephritini 7

– Abdomen polished black, and black setose, marked with yellow basally. Anterior dorsocentral bristles situated about in line with the anterior supra-alars. Wings broad, only two times longer than wide and black with hyaline spots (Text-fig. 11). Subfamily Aciurinae, Tribe Tephrellini . . . ***Platensina zodiacalis*** (Bezzi)

7 Lower margin of head longer than upper. Proboscis elongate and geniculate (Text-fig. 29). Wings irregularly spotted as in Text-fig. 31 ***Stylia sororcula*** (Wiedemann)

– Not as above 8

8 Scutellum with four bristles. Two pairs of superior fronto-orbital bristles present. Wings as in Text-figs. 34, 36 and 38 . . . . . ***Tephritis*** Latreille 9

– Only two scutellar bristles and one pair of superior fronto-orbitals present. Wings as in Text-fig. 28. . . . . ***Actinoptera*** sp. n.
to be described by Ito

9 A large dark brown to black spot covers the anterior median portion of the wing above the *r-m* cross-vein (Text-fig. 34). Femora black . . . . . ***coei*** sp. n.

– Wings lacking such a spot. Femora yellow 10

10 Mesonotum with three brown vittae. Scutellum with a brown spot on each side. Terga three to five each with a pair of submedian brown spots. Apices of cells R_5 and 2nd M_2 hyaline ; wing marked with narrow, transverse streaks of brown (Text-fig. 38) . . . . ***spiloptera*** Bezzi

– No spots or vittae on thorax or abdomen. Apices of cells R_5 and 2nd M_2 marked with brown ; wings largely grey-brown with round hyaline spots (Text-fig. 36) ***daedala*** sp. n.

Subfamily **DACINAE**

Tribe **Dacini**

CALLANTRA Walker

Callantra Walker, 1860, *Linn. Soc. Lond.* (*Zool.*) **4** : 154.
Mellesis Bezzi, 1916, *Bull. ent. Res.* **7** : 114.
Calantra Hendel, 1914, *Wien. ent. Ztg.* **33** : 74.

This genus, composed of approximately two dozen known species, is apparently confined to the Oriental and Pacific regions. These are wasp-like in appearance and are readily differentiated from other Dacini by the elongate, slender antennae (Text-fig. 1) ; the second and third segments combined are about equal to the vertical length of the head, and the length of the entire antenna is greater than the combined lengths of the front and the face ; the first antennal segment is equal in length to the second and at least half as long as the face ; and by the strongly clavate and petiolate abdomen, which bears a prominent hump on each side of the first segment (Text-fig. 4).

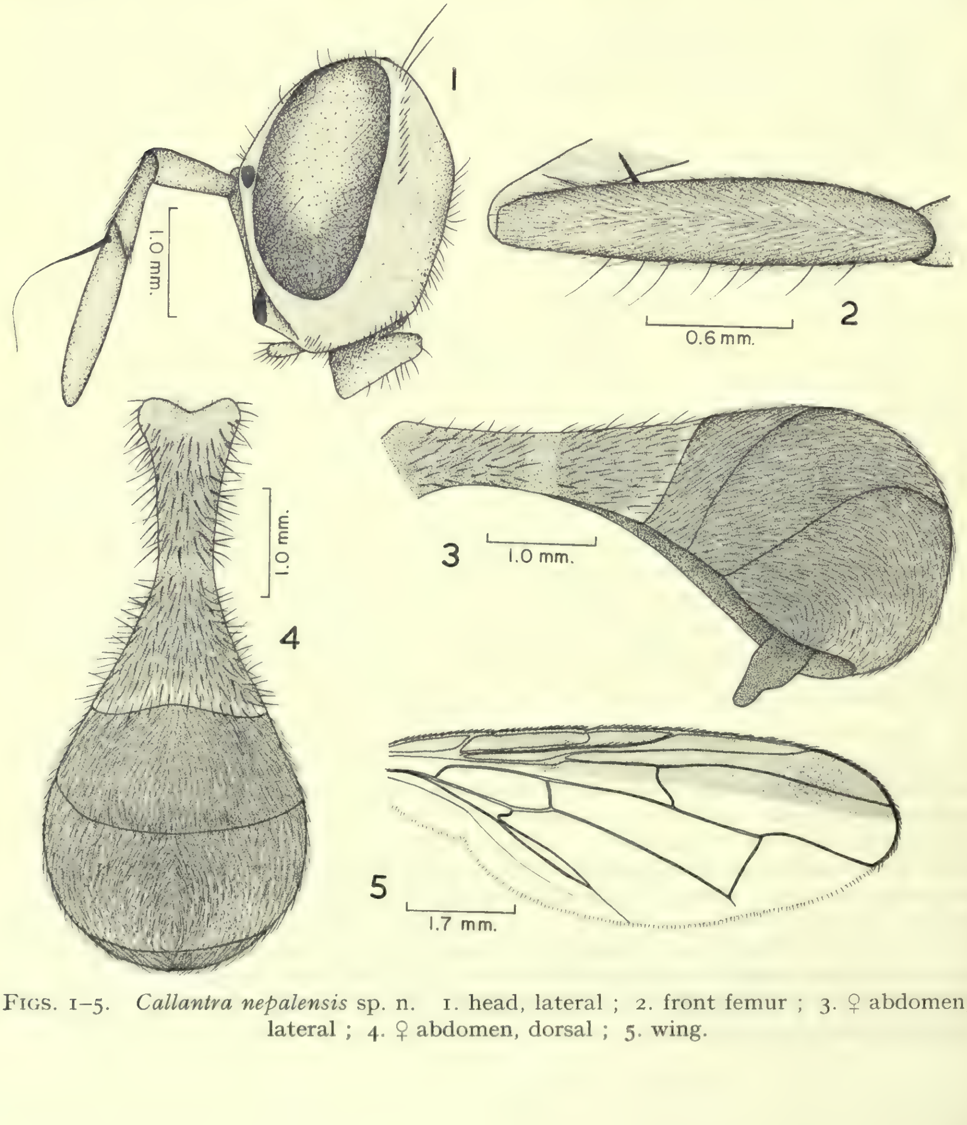
Type species : *Callantra smieroides* Walker.

Callantra nepalensis **sp. n.**

(Text-figs. 1–5)

This species appears to be related to *C. munroi* Rab (1961) but differs by having two superior fronto-orbital bristles rather than only one ; by having one strong anteroventral spine on each front femur, rather than three stout ventral bristles ; by having a longitudinal, brown to black median vitta extending over terga three and four separating off two large yellow submedian spots on tergum four, rather than having a single large pale spot occupying the greater portion of the fourth tergum. Also the female ovipositor is much shorter and less conspicuous in *nepalensis* (Text-fig. 3) than in *munroi* (cf. fig. 2 in Rab, 1961). In the description of *munroi*, Rab states that the ocellar bristles are black. This is probably an error since this group should possess no ocellar bristles, and his drawing shows none.

♀. *Head*. As seen in lateral view the head is distinctly higher than long and the compound eye is rather elongate (Text-fig. 1). The front is about equal in width to the compound eye. The frontal bristles are very weakly developed, small and setae-like, two superior fronto-orbitals are situated at about the upper one-fourth of the front and one inferior fronto-orbital is located just below the middle (note : on one side a tiny black seta is also present near lower portion of front in the specimen at hand). The vertical bristles are well developed, the outer is subequal to the inner. The front is predominantly yellow with a transverse grey-black streak extending across the median portion and with a velvety black mark on each side at the lower edge of the front. The vertex is tinged with brown and the ocellar triangle is shining black. The face is yellow except for a polished black band extending along the lower margin. A faint indication of a brownish discoloration is present at the lower portion of each gena. The occiput, mouthparts, and palpi are yellow, the latter lack bristles or prominent setae. The antennae are rufous, tinged with brown. The first two segments are approximately equal in length, the third is almost equal to the two basal segments (Text-fig. 1). *Thorax.* Predominantly rufous, brightly marked with yellow on the humeri, on the suture, the notopleural calli, the scutellum, the posterior one-third to two-fifths of each mesopleuron, the major portion of each metapleuron, and with a spot of yellow at the upper median edge of each sternopleuron. A faint indication of a median yellow mark is present, extending from behind the suture about halfway to the hind margin of the mesonotum. The anterior margin of the scutellum is narrowly bordered with black. The metanotum is shining black on the sides and a vertical streak of black extends through the median portion of each mesopleuron ; the front portion of the mesopleuron is yellow, tinged with rufous. Only the postalar bristles are developed on the mesonotum except for the small notopleural bristles. One pair of small scutellar bristles are present. These are approximately equal in size to the posterior supra-alars. The scutellum is approximately three times wider than long. *Legs.* Predominantly rufous, tinged with brown. The bases of the



FIGS. 1–5. *Callantra nepalensis* sp. n. 1. head, lateral ; 2. front femur ; 3. ♀ abdomen, lateral ; 4. ♀ abdomen, dorsal ; 5. wing.

mid and hind femora are pale yellow. The hind femora are blackened ventrally. The tarsi are yellow, tinged with brown. The legs are yellow pilose. Each front femur has one strong posteroventral spine at about the apical third of the segment plus a small black bristle (Text-fig. 2). *Wings.* With a broad yellow-brown band along the costal margin, extending across the wing into the upper one-third to one-half of cell R_5 (Text-fig. 5). The second, third and fifth costal sections are approximately equal in length ; the fourth costal section is approximately one-fifth longer than the others. The *r-m* cross-vein is situated near the middle of cell 1st M_2 and is rather strongly curved. The cubital cell is developed into a long slender apical point which is approximately equal in length to the basal portion of the cell (Text-fig. 5). *Abdomen.* Very strongly petiolate, predominantly red, tinged with brown and densely white pilose, especially on the sides. The base of the first tergum is yellow, the apex of the second is yellow, and a pair of large yellow submedian spots are present on terga four and five, these are separated by a median brown to black vitta (Text-fig. 4). The ovipositor is short, inconspicuous, mostly concealed within the ventral concavity of the abdomen and protrudes but a short distance beyond the margins of the terga (Text-fig. 3).

Length : Body, 9·6 mm. ; wings, 8·9 mm.

♂ unknown.

Holotype ♀. E. NEPAL : Evergreen shrubs in rocky ravine on east shore of River Arun, c. 2000′, 25.xii.1961 (*R. L. Coe*), B.M. (Nat. Hist.).

Subfamily **ACIURINAE**

Tribe **Aciurini**

OXYACIURA Hendel

Oxyaciura Hendel, 1927, 49. Trypetidae, in Lindner, *Die Fliegen der Palaearkt. Reg.* **5** : 111.

This genus is readily recognized by the bare vein R_{4+5} ; by having only two scutellar bristles ; and by having the *r-m* cross-vein situated well beyond the middle of cell 1st M_2. The only previously recorded Oriental species is *O. formosae* (Hendel), which was placed in this genus by Shiraki, 1933 : 358. This combination was also listed by Chen (1948 : 70).

Type species : *Aciura tibialis* Robineau-Desvoidy.

Oxyaciura monochaeta (Bezzi) **comb. n.**

(Text-figs. 6–9)

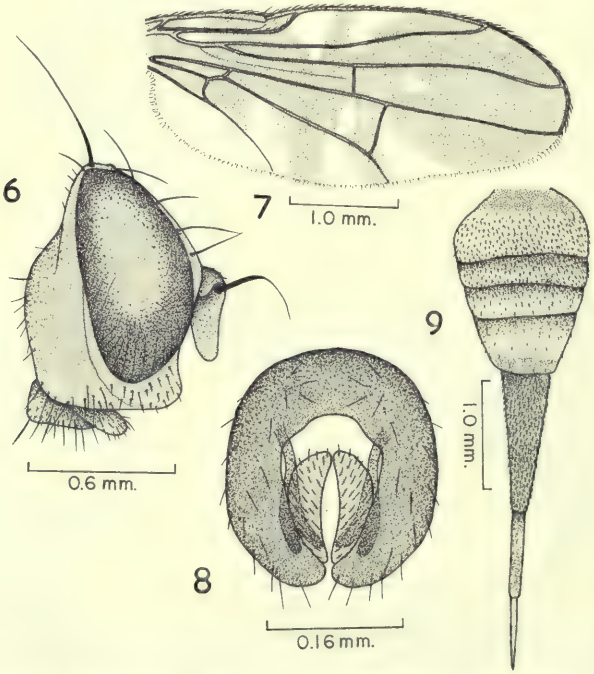
Aciura monochaeta Bezzi, 1913, *Mem. Indian Mus.* **3** : 150, pl. 10, fig. 54.

Bezzi allied this species to *Aciura xanthotricha* Bezzi but said that *monochaeta* differed by having the post-vertical and superior fronto-orbital bristles black, the median portion of the front very sparsely haired, and the ovipositor narrow and equal in length to the abdomen ; rather than having the post-vertical and the superior fronto-orbital bristles pale yellow, the front clothed with short and thick whitish hairs, and the ovipositor broader, shorter than the abdomen in *xanthotricha*. As noted above, it is probable that the latter species also fits in the genus *Oxyaciura*.

This species is readily recognized by the generic characters, by the distinctive wing markings (Text-fig. 7), the predominantly black coloration, and the long ovipositor of the female (Text-fig. 9).

The antennae are yellow, the third segment is three times longer than wide. The aristae are distinctly pubescent. The palpi are entirely yellow, thickly setose around the margins. The head bristles are entirely black. The ocellar and postocellar bristles are short, approximately two-thirds as long as the superior fronto-orbital bristles. The front possesses one pair of superior fronto-orbitals and three pairs of inferior fronto-orbitals. The front is yellow to rufous, tinged lightly with brown and rather thickly covered with yellow-brown pollen. The front is approximately equal in width to one compound eye. The head is shaped as in Text-fig. 6. The thorax is entirely polished black in ground colour, covered with grey pollen. The anterior dorsocentral bristles are situated slightly in front of a line drawn between the anterior supra-alars. The scutellar bristles are strong, approximately two times longer than the posterior dorsocentrals. The wings are marked as in Text-fig. 7. The coxae and femora are predominantly dark brown to black, tinged with yellow on the apices of the first two pairs. The tibiae and tarsi are yellow. The abdomen is polished brown to black in ground colour, covered with light grey pollen. The ovipositor when fully extended is considerably longer than the abdomen (Text-fig. 9). The ovipositor measures approximately 3 mm. (In the specimen figured the piercer is not completely extended.) The male genitalia are as in Text-fig. 8.

Length : Body, 3·7–4·0 mm. ; wings, 3·9–4·5 mm.



FIGS. 6–9. *Oxyaciura monochaeta* (Bezzi). 6. head, lateral ; 7. wing ; 8. ♂ genitalia ; 9. ♀ abdomen, dorsal.

Type locality : INDIA : Calcutta.

Type in the Zoological Survey of India collection.

E. NEPAL : Taplejung Distr., Dobhan, c. 3500′, small pockets of plants on arid slopes above R. Maewa, 1 ♂, 2.i.1962 (*R. L. Coe*).

INDIA : U. P., Tanakpur, 1 ♂, 1 ♀, iv.1949 (*N. D. Waters*).

Tribe **Tephrellini**

PLATENSINA Enderlein

Platensina Enderlein, 1911, *Zool. Jb., Abt. Syst.* **31** (3) : 453.
Tephrostola Bezzi, 1913, *Mem. Indian Mus.* **3** : 153.

The genus is readily recognized by its broad wings with distinctive wing markings and by the presence of two costal bristles at the apex of the subcostal vein.

Type species : *Platensina sumbana* Enderlein.

Platensina zodiacalis (Bezzi)

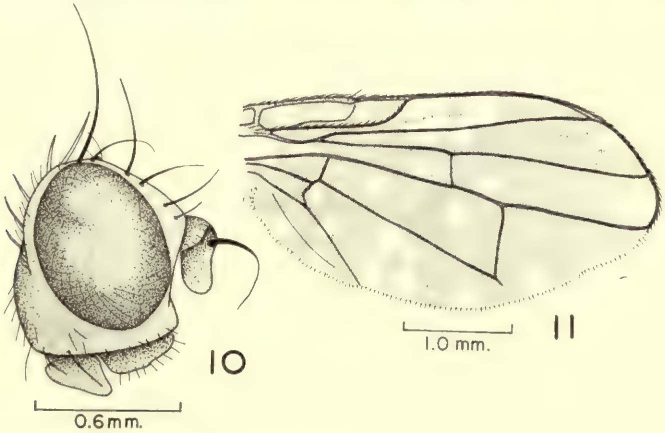
(Text-figs. 10–11)

Tephritis zodiacalis Bezzi, 1913, *Mem. Indian Mus.* **3** : 163, pl. 10, fig. 65.

This species was badly misplaced by Bezzi and should actually have fitted in his genus *Tephrostola* (1913 : 153), which is a synonym of *Platensina* Enderlein (cf. Hendel (1915 : 461) and Hardy (1959 : 208)).

This species is differentiated from other *Platensina* by the distinctive wing markings as shown in Text-fig. 11 and by having only two scutellar bristles developed.

The head excepting the compound eyes is yellow, covered with brownish yellow pollen over the front. The front is approximately equal in width to one compound eye and has numerous small, flat setae in the middle just above the lunule. Two superior fronto-orbital and three inferior fronto-orbital bristles are present. A small dark brown to black spot is present at the base of each frontal bristle (excepting the upper superior fronto-orbitals), and a small brown to black streak is present on each side at the extreme lower margin of the front, opposite the bases of the antennae. The antennae are yellow, the third segment is one and one-half to two times longer than high and is straight on the upper margin (Text-fig. 10). The aristae are conspicuously pubescent. The mouthparts and palpi are pale yellow-white, the palpi are very sparsely setose along the upper margin. As seen in lateral view, the head is shaped as in



FIGS. 10–11. *Platensina zodiacalis* (Bezzi). 10. head, lateral ; 11. wing.

Text-fig. 10. The dorsum of the thorax is black in ground colour, densely grey-pollinose and with a distinct brown mark at the base of each bristle, a brown mark on each side in line with the suture, and a faint discoloration of brown extending down the anteromedian half of the mesonotum. The pleura are largely rufous, tinged with brown in ground colour and densely grey-pubescent. The metanotum is black, covered with grey pollen. The legs are entirely yellow. Each front femur has three rather strong posteroventral bristles on the apical two-fifths of the segment. The wings are as in Text-fig. 11. Two prominent costal bristles are present. The abdomen is predominantly polished black, discolored with yellow in the median portion of the first tergum and with yellow markings on the sides of the first four terga.

Length : Body, 3·75 mm.; wings, 4·3 mm. by approximately 2·15 mm. in width.

The above description is based upon a single male specimen.

The species has been previously recorded only from INDIA. The type locality is Calcutta. The type is in the Indian Zoological Survey collection.

E. NEPAL : Arun Valley, east shore of R. Arun below Tumlingtar, c. 1800′, swept from *Ricinus communis* L., 1 ♂, 23.xii.1961 (*R. L. Coe*).

Subfamily **TRYPETINAE**

Tribe **Gastrozonini**

TAENIOSTOLA Bezzi

Taeniostola Bezzi, 1913, *Mem. Indian Mus.* **3** : 119.

This genus is differentiated by the plumose arista ; by having vein R_{4+5} setose ; by the middle tibia having only one apical spine ; the third antennal segment rounded at the apex ; the ocellar bristles strongly developed ; two or three inferior fronto-orbital bristles present ; and the wings with characteristic transverse bands.

This genus shows close relationship to *Gastrozona* and is separated largely on the basis of the strong orbital bristles. Apparently the number of inferior fronto-orbital bristles is somewhat variable ; the type was reported to have two inferior fronto-orbitals and several of the species described by Hering have been reported to have three inferior fronto-orbitals. It is probable that *Taeniostola gracilis* Bezzi (1913 : 120) does not actually fit in this genus since this species has only one inferior fronto-orbital bristle and only two scutellar bristles. The genus is presently known from five species from the Oriental region and one from Borneo.

Type species : *Taeniostola vittigera* Bezzi.

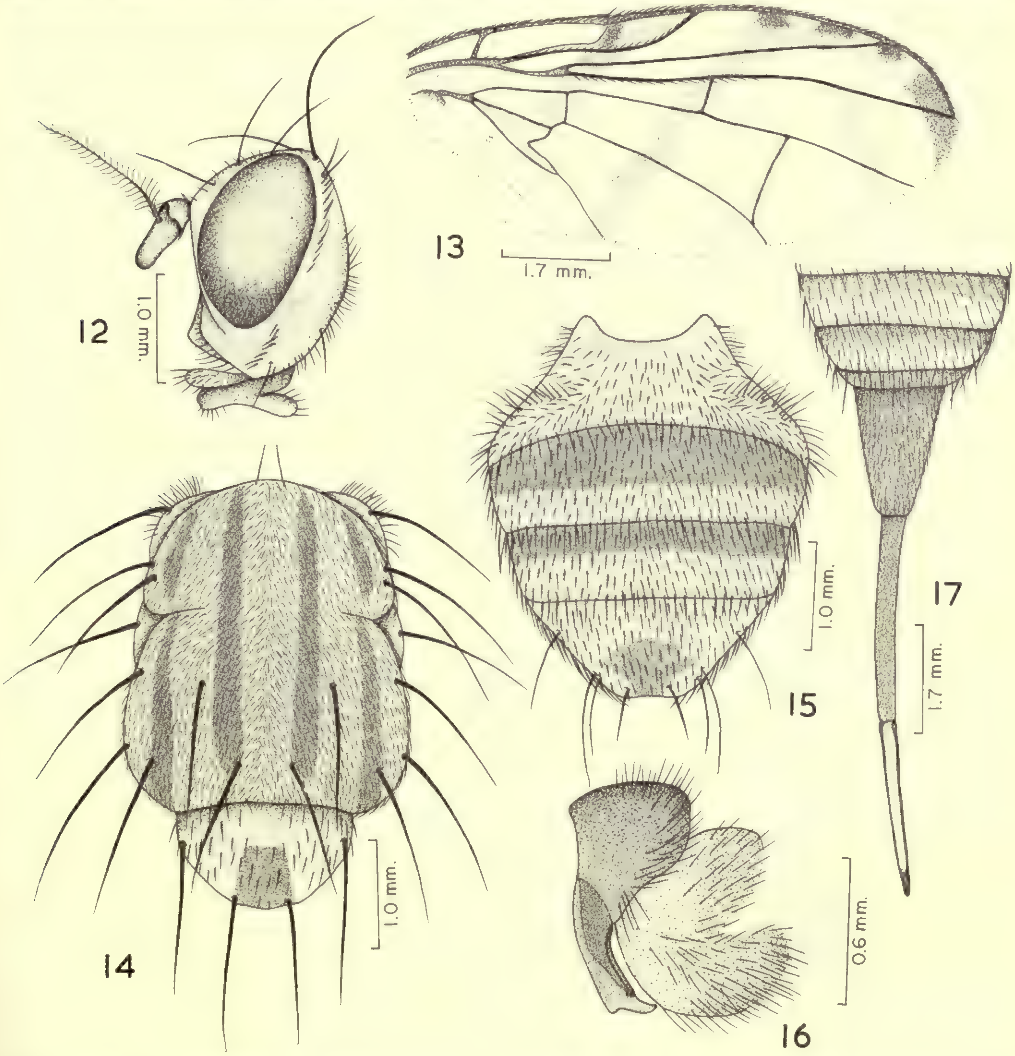
Taeniostola limbata Hendel
(Text-figs. 12–17)

Taeniostola limbata Hendel, 1915, *Ann. hist-nat. Mus. Hung.* **13** : 435, pl. 8, fig. 3.

This beautifully marked species is readily recognized by the pattern of markings on the wings (Text-fig. 13), on the thorax (Text-fig. 14), and on the abdomen (Text-fig. 15).

The species is predominantly yellow, the mesonotum has four longitudinal vittae extending the entire length of the segment ; the lateral vittae are slightly interrupted at the suture.

The scutellum has a prominent black spot in the middle between the apical scutellar bristles. The metanotum is polished black and a shining black spot is present on each pleuron behind the wing base. The anterior dorsocentral bristles are situated slightly behind a line drawn between the anterior supra-alar bristles. The ocellar bristles are stronger than the orbital bristles and are three-fourths as long as the inner verticals. Two strong superior fronto-orbitals and two strong, plus one weak pair of inferior fronto-orbitals are present (Text-fig. 12). The outer vertical bristles are approximately equal in size to the superior fronto-orbitals and the postocellar bristles are approximately equal in size to the anterior supra-alar bristles. The antennae are entirely yellow ; the first and second segments are fringed with black setae around their apices and a prominent black bristle is present on the dorsal surface of the second segment.



FIGS. 12–17. *Taeniostola limbata* Hendel. 12. head, lateral ; 13. wing ; 14. thorax, dorsal ; 15. ♂ abdomen, dorsal ; 16. ♂ genitalia, lateral ; 17. ♀ ovipositor and abdominal segments 4–6.

The third antennal segment is almost three times longer than wide. The arista is rather long-plumose. The head is shaped as in Text-fig. 12. The legs are entirely yellow. Each front femur has a prominent row of posteroventral bristles extending the entire length of the segment; also the posterodorsal surface is strongly setose. Each middle femur has two black posteroventral hairs near the apical third of the segment, and the hind femur has two black posteroventral hairs at the middle. The middle tibia has one strong apical spur, this is almost two-fifths as long as the basitarsus. Wings with two almost complete transverse bands plus two brown streaks; the base of the subcostal cell is black, the remainder of the cell is yellow, this extends as a yellow band transversely across the wing, ending in the apex of the cubital cell. A brown band extends along the wing margin from near the middle of cell R_1 to the middle of cell R_5 and transversely across the wing at a level with the *r–m* cross-vein, ending at the apex of vein $Cu_1 +$ 1st A. An oblique streak of brown extends through cell R_5 just beyond the middle and ends at the wing margin near the tip of cell 2nd M_2. A brown streak also extends across the wing from cell R_5 just above the *m* cross-vein, over the *m* cross-vein and expands at the wing margin in the apex of cell M_4 (Text-fig. 13). The *r–m* cross-vein is situated distinctly beyond the middle of cell 1st M_2. The apex of the cubital cell is drawn out to a slender point. The first two abdominal segments are entirely yellow. A broad black basal band extends across each of terga three and four in the male (Text-fig. 15). The fifth tergum of the male is entirely shining black except for a yellow spot in the middle at the apex. The sixth tergum is not visible in the male but the ninth segment is plainly visible when the abdomen is tilted slightly. The ninth is shining black over the dorsum, yellow on the sides and on the ventral lobes. The ventral lobes are slender, slightly enlarged at apices and developed into two blunt points (Text-fig. 16). The claspers are hidden from lateral view, each is developed into two blunt, black apical points. The cerci are large, densely setose. (The genitalia have been described from specimens from India.)

Length: Body, 8·5 mm.; wings, 9·0 mm. (Hendel recorded this species as body and wings, 8·0 mm. long.)

In the female (specimens from India), terga three to five are rather narrowly bordered with black along the posterior margin and the sixth tergum is plainly visible from dorsal view but is only about one-third as long as the fifth. The sixth is entirely black. The base of the ovipositor is slightly longer than segments four plus five. When fully extended the ovipositor, including the base, is 7·4–8·0 mm. The piercer measures 2·7–2·85 mm.; is one-fourth longer than the base and blunt at apex (Text-fig. 17).

Type locality: FORMOSA. The type is in the Natural History Museum, Vienna. This species was recorded from INDIA by Munro (1935: 17). It is common in northern India. I have seen numerous specimens from the foothills of the Himalayas in the vicinity of Ranikhet and Chaubattia.

E. NEPAL: Taplejung Distr., old mixed forest above Sangu, c. 6,200′, 1 ♂, 25–28.x.1961 (*R. L. Coe*).

Tribe **Trypetini**

CHETOSTOMA Rondani

Chetostoma Rondani, 1856, *Dipt. Ital. prodr.* **1**: 112.
Chaetostoma Loew, 1873, *Monogr. Dipt. N. Amer.* **3**: 212.

The name has been consistently spelled *Chaetostoma* in the literature but this spelling is preoccupied in the fishes by Tschudi, 1846, Fauna Peru: 26. I use the original spelling by Rondani for this genus.

Only nine species of *Chetostoma* have been recorded previously ; two from Europe including Russia, two Nearctic, three from China, one from Burma and one from Japan. This genus is characterized by having a clump of prominent black setae or bristles on the lower portion of each gena (Text-fig. 18) ; by having three pairs of inferior fronto-orbital bristles ; the *r-m* cross-vein situated before the middle of cell 1st M_2 ; and vein R_{4+5} setose to beyond the *r-m* cross-vein.

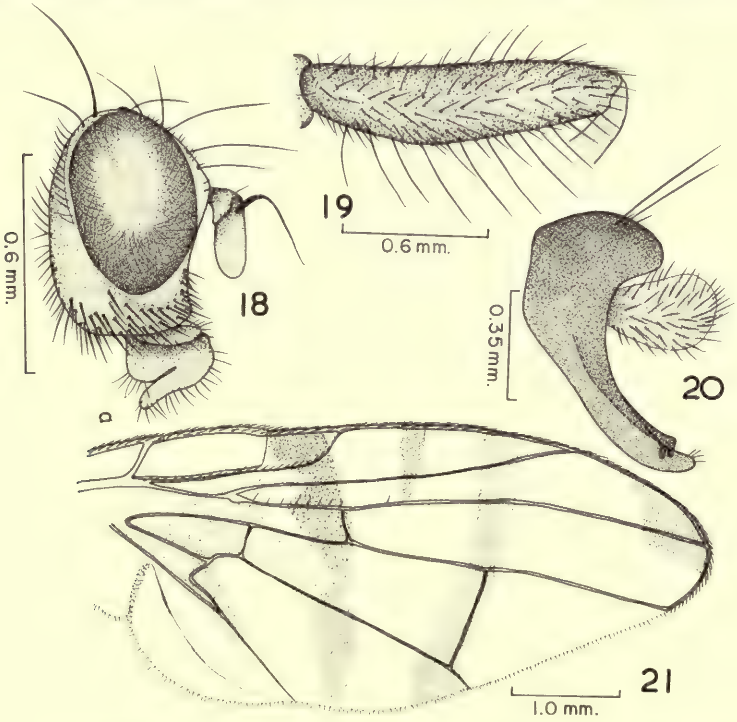
Type species : *Trypeta giraudi* Frauenfeld.

Chetostoma interrupta sp. n.

(Text-figs. 18–21)

This species would resemble *C. diluta* Zia and Chen, from China, by not having the brown band around the apex of the wing continuous with the transverse band over the *m* cross-vein. In other respects however these are not alike and the two species are obviously not related.

♂. *Head*. Distinctly higher than long, the face is almost vertical. The lower margin of each gena is thickly covered with short, black bristles as in Text-fig. 18. The gena is about one-fifth the height of the eye. The front is predominantly yellow, discolored with reddish brown and covered with yellow-grey pollen. The median portion of the front is sparsely black-setose. The front is approximately equal in width to one compound eye. The frontal bristles are strong, two pairs of superior fronto-orbitals and three pairs of inferior fronto-orbital



FIGS. 18–21. *Chetostoma interrupta* sp. n. 18. head, lateral ; 19. front femur ; 20. ♂ genitalia, lateral ; 21. wing.

bristles are present. The ocellar bristles are almost equal in length to the postocellars but are much thinner. The outer vertical bristles are approximately equal in size to the upper superior fronto-orbitals. The ocellar setae are black, well developed, one-half to two-thirds as long as the postocellar bristles. The face is entirely yellow-white and has a very slight raised area down the median portion. The palpi and mouthparts are yellow-white. Each palpus is thickly black-setose around the outer and apical margins. The antennae are predominantly rufous, the second and third segments are tinged with brown along their upper and apical margins. The second segment has one rather prominent dorsal bristle and numerous black setae around the apex. The third segment is rounded at the apex and slightly over two times longer than wide. The arista is pubescent. The head is shaped as in Text-fig. 18. *Thorax.* Predominantly polished black in ground colour, rather densely grey-pollinose, subshining on the pleura and with a polished area in the middle of each sternopleuron, also a polished black spot is present in the middle of the metanotum. The humeri, propleura and front margin of each mesopleuron are yellow, tinged faintly with brown. The hind margin and the ventral portion of the scutellum is yellow. The anterior dorsocentral bristles are situated approximately in line with the anterior supra-alars. The mesonotum is densely black-setose. The scutellum is bare except for a few tiny hairs around the margins and for the four strong bristles. The halteres are pale yellow. *Legs.* The front legs are entirely yellow except for a discoloration of brown to black along the posterior surface of each femur. On the middle and hind legs the coxae are brown to black, tinged faintly with yellow. The trochanters are yellow, tinged with brown. The femora are predominantly black, yellow at their apices and on the apicoventral half of the middle pair. The tibiae and tarsi are yellow except for a tinge of brown to black on the hind tibiae. Each front femur is rather densely bristled over the posterior surface (Text-fig. 19). The middle femur is conspicuously flattened down the ventral surface. Each hind tibia has a rather prominent row of black anterodorsal bristles extending the entire length of the segment. *Wings.* The basal cells are brownish yellow fumose, this marking extends longitudinally through the wing to connect, in cell 1st M_2, with the dark brown transverse mark which extends across the wing at a level with the subcostal cell and the *r–m* cross-vein. The pale marking is interrupted by a large hyaline spot situated in cell R just beyond the forking of veins R_{2+3} and R_{4+5}. The subcostal cell is entirely dark brown except for pale yellow-brown fumosity at the extreme base of the cell. A narrow transverse mark extends from the costa at about one-third the distance between the apices of veins R_1 and R_{2+3}, across the cells R_1 and R_3, ending at vein M_{1+2} well beyond the *r–m* cross-vein. A complete transverse band extends across the wing from the costal margin just before the apex of cell R_1 to the apex of cell M_4 at a level with the *m* cross-vein. A prominent brown mark is present at apex of cell R_3 and extends over into the upper apical portion of cell R_5 (Text-fig. 21). The *r–m* cross-vein is situated distinctly before the middle of cell 1st M_2. The fourth costal section is one-half longer than the fifth and almost four times longer than the third section. Vein R_{4+5} has eight to ten black setae, one of these is situated beyond the *r–m* cross-vein. *Abdomen.* Polished black in ground colour, densely grey-pollinose except for a polished black area extending around the sides and apex of the fifth tergum. The abdomen is thickly black-setose and has prominent black bristles on the apical margins of terga three to five. The genitalia are black, tinged with yellow to rufous on the lower margins of the ninth segment and with the cerci yellow, tinged rather faintly with brown. As seen from a lateral view the genitalia are as in Text-fig. 20. The ventral margins of the ninth segment are elongated, extended on each side into a slender ventral lobe. The claspers are long, rod-like and each terminates in two blunt, black finger-like points. The cerci are nearly oval, very densely setose. Several strong bristles are present on the top margin of the ninth segment.

Length : Body, 3·5 mm.; wings, 6·2 mm.

♀. Unknown.

Holotype ♂. E. NEPAL : Taplejung Distr., damp evergreen oak forest above Sangu, c. 9,200′, 2–26.xi.1961 (*R. L. Coe*).

Paratypes. 2 ♂, same data as Holotype.

Type and one paratype in the B.M. (N.H.) ; one paratype in the University of Hawaii collection.

RHAGOLETIS Loew

Rhagoletis Loew, 1862, *Europ. Bohrfliegen* **14** : 44.

This genus is differentiated by having vein R_{4+5} bare or with only two or three setae at base ; by having the third antennal segment pointed at upper apex ; by the hind femora having several long antero-ventral hairs or bristles before the apex ; by having the ovipositor base very short, not longer than the sixth abdominal segment ; and by having the eyes comparatively high and narrow.

About three dozen species of this genus are known, these range throughout the Holarctic and Neotropical regions but are predominantly temperate climate species. The larvae live in fleshy fruits, nuts, and in rose hips.

It should be noted that Stone (1951 : 47) followed Hendel (1927 : 74) in treating *Zonosema* Loew as a synonym of *Rhagoletis*. Rohdendorf (1961 : 177) treats these as distinct genera.

Type species : *Musca cerasi* Linnaeus.

Rhagoletis rumpomaculata sp. n.

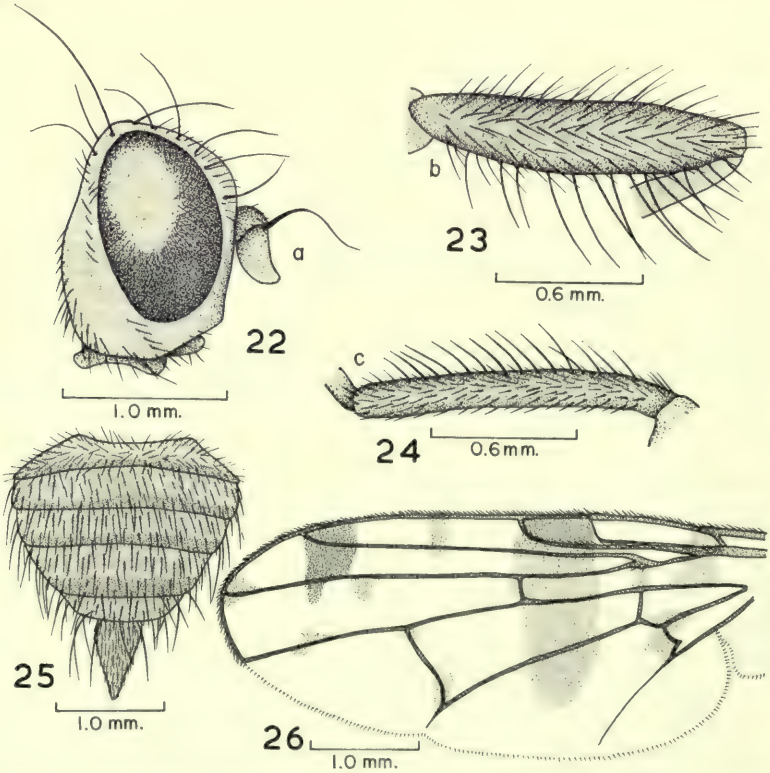
(Text-figs. 22–26)

This species runs to *Rhagoletis* in Hendel (1927 : 20), Zia and Chen (1938 : 9), and Chen (1948 : 82). In the latter two works it runs nearest to *reducta* Hering, from China, but the wing markings are strikingly different. In Rohdendorf's key to the Palearctic species of the genus *Rhagoletis* (1961 : 178) this runs to *almatensis* sp. n. from South Kazachstan, U.S.S.R., but again the wing markings are very different. The species is readily differentiated from any *Rhagoletis* known to me by the broken pattern of the markings in the apical half of the wing ; the bands are completely disrupted, broken into scattered spots (Text-fig. 26). The front femora are more distinctly bristled than in most species which I have seen (Text-fig. 23).

♀. *Head.* As seen from direct lateral view the face is vertical and the lower portion of the occiput is rather swollen so that at its broadest point the occiput is almost one-half the width of the compound eye (Text-fig. 22). Three strong pairs of cruciate inferior fronto-orbital bristles and two pairs of reclinate superior fronto-orbital bristles are present. The ocellar bristles are strong, approximately equal in length to the inferior fronto-orbitals. The post-ocellar bristles are pale brownish yellow and are about two-thirds as long as the ocellar bristles. The vertical bristles are well developed. The occipital setae are pale brown, long and slender. The antennae are yellow, tinged faintly with brown, the third segment is distinctly pointed on the upper apical margin (Text-fig. 22). The arista is bare or nearly so. *Thorax.* Predominantly brown to black in ground colour, densely grey-pollinose and with abundant black setae over the mesonotum. The scutellum is predominantly yellow, tinged with brown, the basal margin is black. The humeri are yellow, tinged with brown and each pleuron is tinged with rufous in the median portion. The propleura and the front margin of each humerus are densely white haired. The anterior dorsocentral bristles are situated approximately opposite the anterior supra-alars. Four strong scutellar bristles are present, these are slightly greater in length than the dorsocentral bristles. The halteres are yellow. *Legs.* Entirely yellow. The front femora are densely setose and each has a row of strong posteroventral bristles extending the full length of the segment (Text-fig. 23). Each hind femur has several anteroventral bristles before the apex of the segment. Each hind tibia has a prominent row of anterodorsal bristles extending the full length of the segment (Text-fig. 24). *Wings.* With an incomplete brown marking extending across the base ; a broad brown mark extending transversely from the costa, filling all of the third costal section (cell Sc), across the wing into the middle of cell M_4 ; also with a single transverse streak across the middle of cell R_1 ; another brown mark at the apex of cell R_1 which extends transversely across vein R_{4+5} into cell R_5 ; another brown spot is present at the apex of vein R_{4+5} ; another is present in the upper median portion of cell R_5 ; a spot is present near the median portion of the last section of vein M_{1+2} ; and one is also present on each end of the *m* cross-vein as in Text-fig. 26. Vein R_1 is setose throughout its entire length. Vein R_{4+5} has two small setae at its base. The *r–m* cross-vein is situated at the middle of cell 1st M_2. The cubital cell is sharply pointed at the apex. *Abdomen.* Predominantly polished black in ground colour, lightly grey-pollinose, each tergum has a distinct yellow band along the posterior margin. Moderately strong bristles are present on the posterior margins of the terga, especially five and six. Tergum six is approximately one-half as long as five. The ovipositor is short, rather inconspicuous, as seen *in situ* the visible portion is approximately equal to abdominal segments five and six (Text-fig. 25).

Length : Body and wings, 5·7 mm.

♂. Unknown.



FIGS. 22–26. *Rhagoletis rumpomaculata* sp. n. 22. head, lateral ; 23. front femur, hind view ; 24. hind tibia, dorsal ; 25 ♀ abdomen, dorsal ; 26. wing.

Holotype ♀. E. NEPAL : Taplejung Distr., damp evergreen forest above Sangu, c. 9,200′, 2–26.xi.1961 (*R. L. Coe*), B.M. (Nat. Hist.).

Subfamily **TEPHRITINAE**

Tribe **Tephritini**

ACTINOPTERA Rondani

Actinoptera Rondani, 1871, *Bull. Soc. ent Ital.* **3** : 162.

This genus is readily recognized by having only one pair of superior fronto-orbital bristles, only two scutellar bristles, and by having the anterior dorsocentral bristles situated opposite the suture.

This is predominantly a European genus, though two species have been recorded from China (Zia and Chen, 1938 : 95), one has been recorded from Formosa (Shiraki, 1933 : 447), and one new species is being described from Japan by Dr. S. Ito in a monograph of the Japanese fruit flies (in press) ; I am recording the latter species also from Nepal.

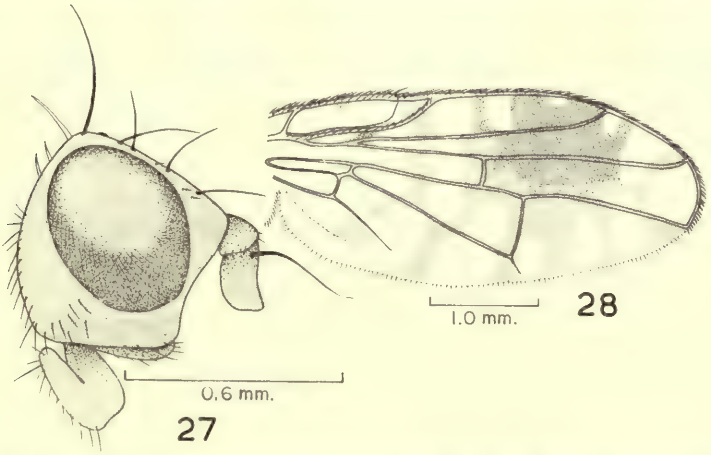
Type species : *Tephritis discoidea* Fallén.

***Actinoptera* sp. n.** (in Ito manuscript, in press)

(Text-figs. 27–28)

Actinoptera ——— sp. n. Ito (in press), Beitrag zur Systematik der Japanischen Trypetiden (Diptera).

I have had access to Dr. Ito's manuscript and feel certain that the species here recorded from Nepal is the same as the one he is describing as new from Japan. This species rather closely resembles *A. discoidea* (Fallén) from Europe but the wing



FIGS. 27–28. *Actinoptera* sp. n. being described by Ito. 27. head, lateral ; 28. wing.

markings differ. The most striking character for separating the new species is the presence of three hyaline marks in cell R_1 beyond vein R_1 rather than two, as in *discoidea*, and by the presence of a faint brown streak extending across the middle of the second costal section.

This is a densely grey-pollinose species with all yellow legs, halteres, antennae and mouthparts. It is being adequately described by Dr. Ito. The profile view of the head is as in Text-fig. 27 and the wings are as in Text-fig. 28.

Length : Body, 2·5 mm. ; wings, 3.0 mm.

It should be noted the specimens from Nepal are slightly shorter than those which will be recorded from Japan by Dr. Ito. His specimens measured : Body, 3·0 mm. ; wings, 3·5 mm.

E. NEPAL : Taplejung Distr., north of Sangu, dry grass above river bank, c. 5,000′, 2 ♂, 5.i.1962 (*R. L. Coe*).

STYLIA Robineau-Desvoidy

Stylia Robineau-Desvoidy, 1830, *Mém. prés. Acad. Soc. Paris* **2** : 754.
Paroxyna Hendel, 1927, 49, Trypetidae, in Lindner, *Die Fliegen der Palearktischen Reg.* **5** : 146.
Dioxyna Frey, 1945, *Comment. Biol., Helsingf.* **8** (10) : 62.

The correct generic name for this group has been most controversial. Hering (1954 : 167) designated *Stylia bidentis* Robineau-Desvoidy (1830) as the type of the genus *Stylia* Robineau-Desvoidy and indicated that this was congeneric with *Trypeta tessellata* Loew (1864), the type of the genus *Paroxyna* Hendel. Hering has treated *Paroxyna* as a synonym of *Stylia*. Munro (1957 : 919) designated *Stylia mentharum* Robineau-Desvoidy as the type of the genus " which thus remains a synonym of *Myopites* ". I see no logical reason for Hering's designation not being accepted since it is the better known species and his designation does have priority. I am following his advice in treating *Paroxyna* as a synonym of *Stylia* (cf. Hardy and Adachi, 1956 : 21). Hering obviously does not, in this case, consider the number of scutellar bristles and the head shape to be of generic importance and he treats *sororcula* (Wiedemann) in the genus *Stylia* (1956 : 74). *Trypeta sororcula* Wiedemann was used as the type of the genus *Dioxyna* Frey (1945 : 62). This species is closely related to *Stylia bidentis* and the two fit in a group which is characterized by having only one pair of well-developed scutellar bristles (the apical pair is rudimentary, hair-like in *bidentis* and completely lacking in *sororcula*) and the head distinctly longer than high ; rather than having four well-developed scutellar bristles and the head higher than long, as in *tessellata*. Dr. S. Ito, in his monograph of the Trypetidae of Japan (in press) treats *Paroxyna* as a subgenus of *Stylia* with the typical subgenus containing the species *bidentis* and *sororcula*. This appears to be a logical treatment.

This genus is differentiated by having the lower margin of the head longer than the upper margin ; by the long slender geniculate proboscis ; the long slender palpi (Text-fig. 29) ; and by the irregularly spotted wings (Text-fig. 31).

Stylia sororcula (Wiedemann)
(Text-figs. 29–32)

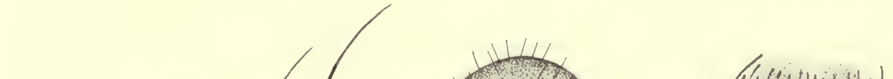
Trypeta sororcula Wiedemann, 1830, *Aussereur. Zweifl. Ins.* **2** : 509.

For the synonymy under this species cf. Munro (1957 : 938–939). The species has been treated in the literature under a variety of generic combinations. Bezzi (1913 : 159) treated it under *Oxyna* Robineau-Desvoidy.

This is a small species, differentiated from *bidentis* by having the femora black except at the apices, by completely lacking the apical scutellar bristles, as well as by its smaller size and other details. *S. bidentis* has the femora entirely reddish yellow and the apical scutellar bristles are rudimentary, hair-like. The above characters along with the distinctive generic characters will readily separate *sororcula*.

The head is shaped as in Text-fig. 29 and the wings are as in Text-fig. 31. The thorax is dark brown to black in ground colour, rather densely grey-pollinose and with conspicuous, yellow, squamose setae extending over the dorsum. On some specimens three indistinct brown vittae extend at least part way down the metanotum. Two inferior fronto-orbital bristles and two superior fronto-orbital bristles are present. The upper superior fronto-orbital is yellow. The palpi are long and slender. The abdomen is densely grey-pollinose, with a pair of submedian, subshining brown spots on each of terga three to five. In the female the ovipositor base is shining black and almost equal in length to segments four to six (Text-fig. 32). The male genitalia are as in Text-fig. 30.

Length : Body, 2·5 mm.; wings, 2·8 mm.



FIGS. 29–32. *Stylia sororcula* (Wiedemann). 29. head ; 30. ♂ genitalia ; 31. wing ; 32. ♀ abdomen, dorsal.

Distribution. Widespread throughout the tropics and subtropics of the world. I have numerous specimens on hand from Northern India.

Hosts. This is a seed infester. It lives in the flower heads of *Bidens*, *Coreopsis*, and other composites. Coe captured it on *Lycopodium* sp.

E. NEPAL : 7 ex., Taplejung Distr., north of Sangu, dry grass above river bank, c. 5,000′, 5.i.1962 (*R. L. Coe*) ; Dobhan, c. 3,500′, small pockets of plants on arid slopes above R. Maewa, 2.i.1962 (*R. L. Coe*) ; and on slope above Sangu, c. 7,800′, ex *Lycopodium* sp. 11–14.i.1962 (*R. L. Coe*).

TEPHRITIS Latreille

Tephritis Latreille, 1804, *Nouv. Dict. d'Hist. Nat.* **24** : 196.

This is a very large, somewhat conglomerate group which, in a broad sense, is recognized by having four scutellar bristles ; two superior fronto-orbital and two inferior fronto-orbital bristles ; the thorax and abdomen pollinose and predominantly covered with recumbent pale scales ; vein R_{4+5} bare or with but a few setae at its base ; and the anterior dorsocentral bristle situated in line with or very near the suture. For the most part the species of *Tephritis* have the wings characteristically spotted with brown over the entire surface. This is predominantly a Palearctic and Nearctic group of flower-head infesting species. The group is poorly known in the Orient. For a comprehensive key to the *Tephritis* cf. Hering (1944).

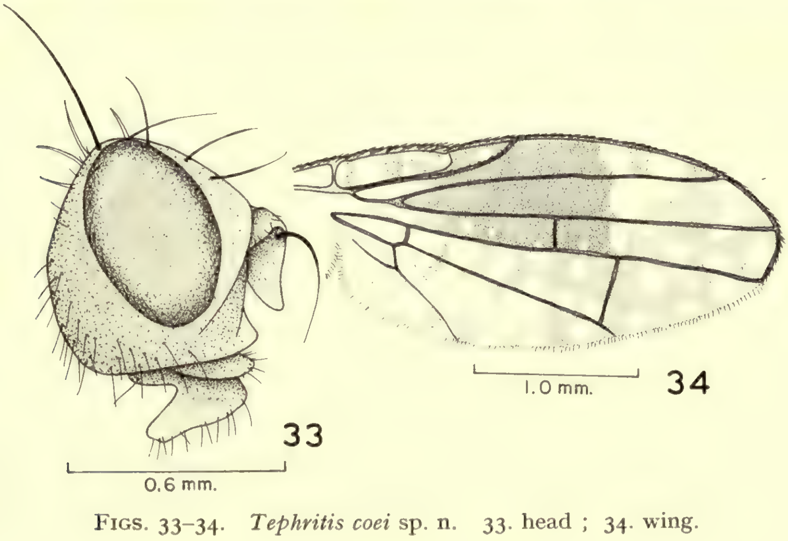
Type species : *Musca arnicae* Linnaeus.

***Tephritis coei* sp. n.**

(Text-figs. 33–34)

This species appears to be related to *T. impunctata* Shiraki, from Formosa, and runs near that species in Hering's key to the known *Tephritis* (1944 : 20). It differs rather distinctly from *impunctata* and is best differentiated by the presence of a small hyaline mark in the subcostal cell, by the presence of only two hyaline marks in cell R_1, and by having a large all brown to black area situated above the *r–m* cross-vein (Text-fig. 34), as well as by many other details.

♂. *Head*. Almost quadrate as seen in direct lateral view, the face is vertical and the front almost horizontal ; with the epistoma slightly protruding (Text-fig. 33). Two pairs of superior fronto-orbital and two pairs of inferior fronto-orbital bristles are present. The upper superiors are white and flattened. The ocellar bristles are strong, black, longer than the orbitals and two-thirds to three-fourths as long as the inner vertical bristles. The inner verticals are black, the outer verticals and the postocellar bristles are white, flattened like the occipital setae except about two times longer. The lower portion of the occiput is rather thickly white-setose, the genae have sparse inconspicuous white pile. The median portion of the front is bare. The first two antennal segments are yellow, the third segment is yellow, tinged with brown and covered with grey pollen. The third segment is subacutely pointed (Text-fig. 33). The arista is minutely pubescent. *Thorax*. Black in ground colour, densely grey-pollinose and with five brown vittae extending longitudinally over the mesonotum; one narrow median vitta extends from the anterior margin to about halfway between the dorsocentral bristles ; one broad vitta extends down each dorsocentral line the full length of the mesonotum ; and one vitta is present on each side, in line with the inner supra-alars and the presutural bristles but interrupted at the suture. The scutellum has a U-shaped brown mark which extends around the apex and to the base on each side, in line with the posterior bristles. The pleura are slightly discoloured with brown, especially along the hind borders of the mesopleura. The anterior dorsocentral bristles are situated just slightly behind the suture. The mesonotum is covered with white, recumbent, scale-like hairs. The scutellum is bare except for the four strong bristles and except for one flat scale on each side near the base. The apical scutellars are about two-thirds as long as the basal pair and are crossed at their apices. The halteres are yellow, tinged faintly with brown. *Legs*. The coxae are black, tinged faintly with yellow. The femora are black, covered with grey pollen, except for their extreme apices which are yellow. The tibiae and tarsi are yellow. The trochanters are yellow, tinged faintly with brown. The front femur has five posteroventral bristles extending the full length of the segment. *Wings*. Marked as in Text-fig. 34. With only one bristle present at the apex of the subcostal vein, vein R_1 setose and vein R_{4+5} bare. Vein R_{2+3} very slightly undulated in the median portion. The third costal section, between vein *Sc* and R_1, is about equal in length to the fifth section, between the apices of vein R_{2+3} and R_{4+5} and the fourth costal section is approximately three times longer than either the third or the fifth. The *r–m* cross-vein is situated near the apical one-fourth of cell 1st M_2 and the cubital cell has a short apical point. The second costal cell (between the humeral cross-vein and vein *Sc*) has three brown marks. A large rather quadrate, dark brown mark extends over the area of the wing bounded by the costal margin from the end of the subcostal vein to about the median portion of cell R_1, transversely across the wing to a level extending approximately through the upper median portion of cell R_5. This area is uninterrupted except for a small hyaline spot in the subcostal cell (Text-fig. 34). Beyond this brown mark are two hyaline spots in cell R_1, these are continuous into cell R_3 and converge beyond vein R_{2+3}. The hyaline mark extends through the apical portion of cell R_3 just beyond the apex of vein R_{2+3}, this extends transversely into the upper portion of cell R_5. In addition to this latter spot in R_5 eight round spots are present beyond the *r–m* cross-vein, also approximately six small round spots are present in cell *R* before the cross-vein. Cell 2nd M_2 has five round spots. Cell 1st M_2 is hyaline through the basal one-third to one-fourth, except for a brown marking along the basal section of vein M_{3+4} and has six hyaline marks in the apical two-thirds. Cell M_4 has approximately eight brown markings, these are separated into spots at the basal portion but converge in the apical portion of the cell to enclose two brown spots at the wing margin. A brown spot is present



FIGS. 33–34. *Tephritis coei* sp. n. 33. head ; 34. wing.

over the apex of the cubital cell at the basal portion of vein Cu_{1+}1st *A*. *Abdomen.* Predominantly grey-pollinose with two large grey-brown submedian spots on each tergum, these are separated by a more distinctly grey, median vitta extending longitudinally the full length of the abdomen. The apices of the terga are also distinctly grey. The abdomen is entirely covered with recumbent, yellow-white scales. The genitalia have not been relaxed for study.

Length : Body, 2·85 mm.; wings, 3·2 mm.

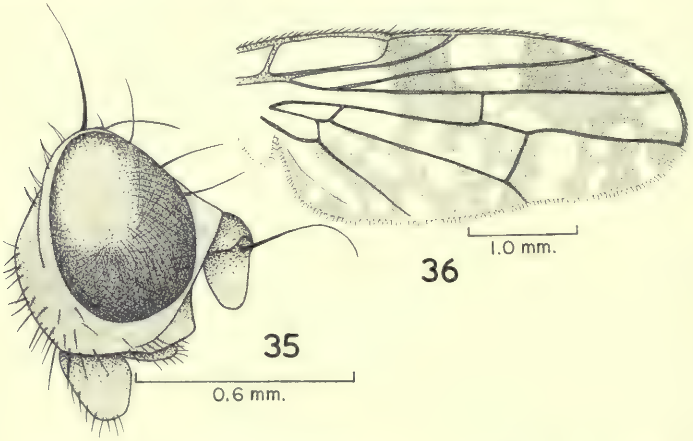
♀. Unknown.

Holotype ♂. E. NEPAL : Taplejung Distr., north of Sangu, dry grass above river bank, c. 5,000′, 5.i.1962 (*R. L. Coe*), B.M. (Nat. Hist.).

Tephritis daedala sp. n.

(Text-figs. 35–36)

This species apparently closely resembles *punctata* Shiraki, from Formosa, but the wing markings are distinctly different, for example the large apical hyaline spot in cell R_5 and the cluster of round hyaline spots bordering the *r-m* crossvein are distinctive. In Bezzi (1913 : 162) it would run to *T. lyncea* Bezzi and the wing markings are somewhat similar in these two species. However it is probable that *lyncea* fits in another genus since only one superior fronto-orbital bristle is present. The two also differ in other respects. In the key to the Trypetidae of North China (Zia and Chen 1938 : 69) this would run near *T. recurrens* Loew and *T. consimilis* Zia and Chen but the wing markings are very different from either of these species and these are apparently not related. In Hering's extensive key to the *Tephritis* (1944 : 20) this would run to *vespertina* Loew, from Europe and North Africa but differs by the wing markings ; the brown marks at the end of veins R_{4+5} and M_{1+2} do not form a mushroom-shaped marking ; a large white apical spot is present in cell R_5, rather than a tiny apical spot ; the subapical spot in cell R_3 is separate from a hyaline mark situated in the upper apex of cell R_5, rather than these spots being fused, etc.



FIGS. 35–36. *Tephritis daedala* sp. n. 35. head ; 36. wing.

♂. *Head.* Entirely yellow except for a tinge of reddish brown on the front, at the base of the antenna, and on the genae ; also the compound eyes are brownish-red with a distinct green sheen, they are red around their margins. Two superior fronto-orbital and two inferior fronto-orbital bristles are present. The upper superior fronto-orbitals are yellow, flat, rather scale-like and approximately equal in size to the occipital setae. The ocellar bristles are strong, about two-thirds to three-fourths as long as the inner vertical bristles. The postocellar and outer vertical bristles are yellow, flat, scale-like, about two times larger than the occipital setae. The lower edge of each gena has numerous dark setae along the margin. The antennae are yellow, the third segment is rounded at the apex. The arista is minutely pubescent. The head is shaped as in Text-fig. 35. *Thorax.* Predominantly black, densely covered with grey pollen and lacking brown vittae on the mesonotum. The mesonotum is covered with yellow-white scales. The anterior dorsocentral bristles are situated in line with the suture. Four pairs of scutellar bristles are present. The apical bristles are rather small, about one-third as long as the basal bristles and are crossed at their apices. The scutellum has three or four flat, yellow scales on each side, and is otherwise bare. The humeri are yellow-red in ground colour, this colour is obscured however by the dense covering of grey pollen. The halteres are pale yellow. *Legs.* Entirely yellow. The bristling is apparently typical for *Tephritis*. *Wings.* Predominantly grey-black covered with an abundance of hyaline marks as in Text-fig. 36. The portion of the costal cell beyond the humeral cross-vein has a faint indication of a brown mark at the base and another near the middle. The subcostal cell is brown except for a hyaline mark near the apical portion. Cell R_1 has three hyaline marks beyond the apex of vein R_1. Cell R_3 is hyaline at its base, has two hyaline spots in the middle, connected with the hyaline marks in cell R_1, and two hyaline spots at the apex of the cell. The base of cell R_2 is hyaline and three or four hyaline spots are found in the apical two-thirds of the cell. Cell R_5 has two hyaline spots adjoining the *r–m* cross-vein and about six spots beyond this point, the apical spot is enlarged (Text-fig. 36). The basal third of cell 1st M_2 is hyaline and approximately five hyaline spots are present in the apical two-thirds of this cell. Cell 2nd M_2 has six hyaline spots, three of these are on the wing margin. Nine hyaline spots are present in the apical two-thirds of cell M_4, the basal portion of this cell is hyaline. The fourth costal section (between the apices of veins R_1 and R_{2+3} is about two times longer than the fifth section and approximately three times longer than the third costal section. The *r–m* cross-vein is situated near the apical one-fifth of cell 1st M_2, scarcely more than its own length from the *m* cross-vein. *Abdomen.* Entirely black, covered with brownish grey pollen and with no brown markings. Entirely covered with yellow, scale-like setae except for a row of black bristles around the hind margin of segment five. The genitalia are rufous. These have not been relaxed for study.

Length : Body, 2·5 mm.; wings, 2·9 mm.

♀. Unknown.

Holotype ♂. E. NEPAL : Taplejung Distr., north of Sangu, dry grass above river bank, c. 5,000′, 5.i.1962 (*R. L. Coe*), B.M. (Nat. Hist.).

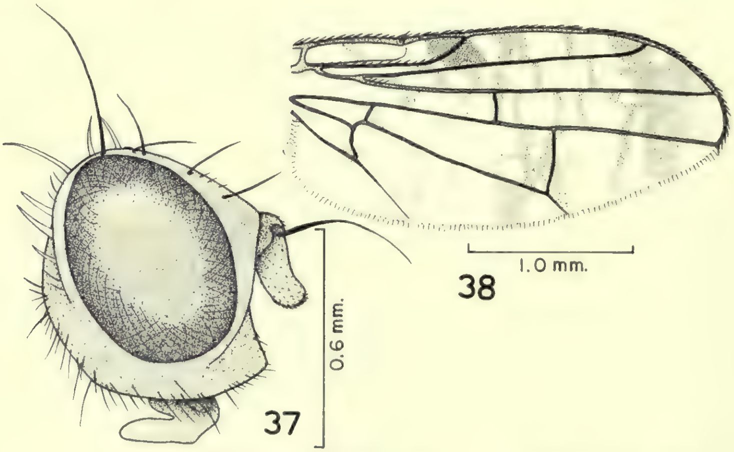
Tephritis spiloptera Bezzi
(Text-figs. 37–38)

Tephritis spiloptera Bezzi, 1913, *Mem. Indian Mus.* **3** : 165.

In Shiraki's key to the Trypetidae of the Japanese Empire (1933 : 375) this species would run to *Teratephritis* Shiraki by having the dorsocentral bristles situated distinctly behind the suture. This is not a *Teratephritis* however, the front is bare, not setose, the hind femora lack ventral bristles, etc. and I feel it is best to treat this as a *Tephritis*.

This species is very readily differentiated by the peculiar markings on the wings as shown in Text-fig. 38 ; by having three distinct brown vittae extending down the mesonotum ; two dark brown spots on the scutellum, one each at the bases of the anterior bristles ; and by abdominal terga three to five each having a pair of prominent brown spots. The head is as in Text-fig. 37. The thorax is predominantly black in ground colour, densely grey-pollinose and with a brown vitta extending down each dorsocentral row and also a median brown vitta on the mesonotum.

I see no way to differentiate this from *T. spiloptera* Bezzi except that he indicates that that species has only one superior fronto-orbital bristle and there are slight differences in the brown markings in cell *R*. In view of the fact that these are so similar, however, and a specimen of *spiloptera* is not available for comparison, I prefer to call this species *spiloptera* and assume that Brezzi's reference to a single superior fronto-orbital bristle must have been an error.



FIGS. 37-38. *Tephritis spiloptera* Bezzi. 37. head; 38. wing.

I am unable to find any related species in the literature. In Zia and Chen's key (1938 : 69) *spiloptera* would run near *T. oedipus* Hendel and *T. ramulosa* Zia and Chen. But the wing markings are very different and it could not be confused with these species. The hyaline apices of cells R_5 and M_2 and the transverse streaking effect of the black markings near the median portion of the wing will readily separate *spiloptera* (Text-fig. 38).

The humeri are yellow in ground colour. The scutellum is yellow except for the dark brown spot at the base of each of the anterior bristles. The mesonotum is densely covered with white scales and the scutellum has numerous white scales scattered over the disc. The apical scutellar bristles are strong, almost equal in length to the basal bristles. The legs are entirely yellow except for a faint discoloration of brown to black in the middle of the ventral margin of the hind femur. The abdomen is predominantly black in ground colour, densely grey-pollinose and white-pilose. The apices of the terga are narrowly yellow and the brown, submedian spots on terga three to five are prominent. The male genitalia are yellow to rufous ; these have not been relaxed for study.

Length : Body, 2·85 mm. ; wings, 3·0 mm. (Bezzi gave the length as 3·0 mm., I presume this was for the body).

Type locality : Calcutta.

Type in the Zoological Survey of India collection.

E. Nepal : Arun Valley : Tumlingtar Plateau, c. 2,000′, collected on yellow blooms of cultivated composite, 10–16.xii.1961 (*R. L. Coe*), B.M. (Nat. Hist.).

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DIPTERA FROM NEPAL

THE BLOW FLIES (DIPTERA: CALLIPHORIDAE)

By MAURICE T. JAMES

SYNOPSIS

This paper is based on a collection of Calliphoridae made by R. L. Coe on the British Museum East Nepal Expedition of 1961–1962. Fourteen species are listed, of which three are described as new.

ALL holotypes and allotypes are in the British Museum (Natural History). I express my gratitude to Mr. Coe and to the officials of the Museum for making this interesting collection available to me for study.

Subfamily **POLLENIINAE**

Pollenia rudis (Fabricius)

Musca rudis Fabricius, 1794 : 314.

E. NEPAL : Taplejung Distr., above Sangu, damp evergreen oak forest, c. 9,200′, 1 ♀, 2–26.xi.1961 (*R. L. Coe*).

This common and widespread Holarctic species has been recorded from India by Senior-White, Aubertin and Smart (1940).

Subfamily **CALLIPHORINAE**

Calliphora vomitoria (Linnaeus)

Musca vomitoria Linnaeus, 1785 : 595.

E. NEPAL : Taplejung Distr., above Sangu, damp evergreen oak forest, c. 10,400′, 1 ♀, 2–26.xi.1961 (*R. L. Coe*) ; Sangu, mixed vegetation by stream in gully, c. 6,200′, 1 ♂, xi.1961–i.1962 (*R. L. Coe*).

Like the above, this is a common and widespread Holarctic species. Senior-White, Aubertin and Smart have recorded it from the western Himalayas, Darjeeling, and Sikkim.

Lucilia porphyrina (Walker)

Musca porphyrina Walker, 1856 : 24.

E. Nepal : Taplejung Distr., Sangu, mixed vegetation by stream in gully, c. 6,200′, 1 ♀, 1 ♂, x.1961–i.1962 (*R. L. Coe*) ; below Sangu, by stream in shady ravine, c. 6,000′, 1 ♂, 30.x.1961 (*R. L. Coe*) ; above Sangu, old mixed forest, c. 6,200′, 2 ♀, 25–28.x.1961 (*R. L. Coe*).

This is a widespread Oriental, eastern Palearctic, and Australian species.

Lucilia papuensis Macquart

Lucilia papuensis Macquart, 1842 : 141.

E. Nepal : Taplejung Distr., above Sangu, evergreen shrub, c. 6,500′, 1 ♂, 5–13.x.1961 (*R. L. Coe*) ; between Sangu and Tamrang, mixed shrubs in deep gorge, c. 5,200, 2 ♂, x–xi.1961 (*R. L. Coe*).

This widespread Oriental and Australasian species is, according to Senior-White, Aubertin and Smart (1940), one of the commonest Indian green-bottle flies. It is similar in appearance to *L. porphyrina* but may readily be differentiated from that species by the position of the first pair of postsutural acrostichals, which are in line with the second pair of posterior dorsocentrals (distinctly in front of the posterior dorsocentrals in *porphyrina*) and by the shorter third antennal segment, the apex of which is distant from the oral margin by at least the width of the third antennal segment (much less so in *porphyrina*).

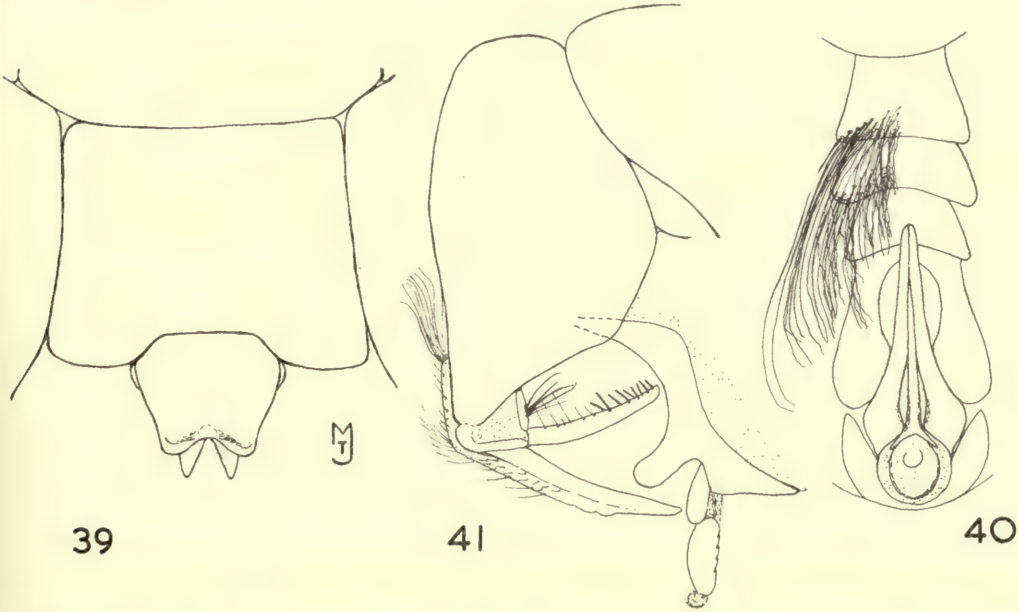
***Bengalia subnitida* sp. n.**

(Text-fig. 39)

MALE. Head yellow in ground colour, becoming brownish on the frontals and parafrontals ; a shining black spot on each parafacial opposite bases of antennae ; head mostly whitish to yellowish pollinose, pollen of parafrontals brownish yellow. Parafacials, parafrontals, and frontals except upper third and on a narrow median stripe, with rather abundant, short, black setulae ; pile of occiput and genae soft, rather long, whitish ; a few black setulae near vibrissae and along oral margin ; hairs of upper part of occiput scant. Sides of front parallel, about one-third head width. Clypeus rounded, but little projecting, apparent but barely so when the head is viewed dorsally. Antenna mostly yellow ; second segment reddish brown ; third segment largely dusky beyond arista ; arista brown at base, otherwise blackish. Uppermost frontal bristle reclinate, almost as long as outer vertical ; 7 to 8 frontals ; vibrissa almost level with lower margin of facial sclerotization ; about 11 bristles along oral margin below vibrissa. Palpus yellow, somewhat spatulate, with black setulae and bristles ; proboscis yellowish brown, the colour somewhat deeper above, the usual bristles black. Measurements of head (in micrometer units : 60 = 1 mm.) : head width, 276 ; width, at narrowest, of front, 92, of frontale, 65 ; length of third antennal segment, 58 ; distance vibrissa to oral margin, 5 ; distance between vibrissae, 50.

Thorax black ; humeral slopes and immediate posthumeral areas of mesonotum reddish yellow to yellowish ; propleuron yellow, becoming dusky in its depression ; apex of scutellum becoming yellowish. Protuberances below wing bases yellow. Mesonotum densely brownish pollinose, marmorated as a result of patches of less dense pollen ; thickly black setulose except a small triangular presutural patch and an elongated wedge-shaped postsutural patch between the dorsocentral and intra-alar rows. Dorsocentrals 2 : 4. Pleura whitish pollinose and mostly black setulose ; hairs of mesothoracic and metathoracic spiracles whitish ; some long bristle-like setae in mesopleural row, mixed black and yellow ; pteropleural setae mostly black, some whitish. Postalar declivity with fine whitish pile. Prosternal hairs white. Legs largely yellow, the front femur dorsally and the middle and hind femora except at extreme base and apex black. Bristles of under side of thorax appearing especially long and dense, resulting especially from rows on the ventral surface of the sternopleura and on the middle and hind coxae. All tibiae long-villous posteroventrally, the hind pair also anteroventrally ; apical half of first and second tibiae and apical two-thirds of hind tibia with long hairs, increasing in length from about diameter of tibia on the first to twice diameter of tibia on the third pair. Front tibia with a closely-set row of short spinose bristles on its second fourth ventrally ; hind femur with a posteroventral apical comb of about ten spines ; hind tibia without posterodorsals ; hind tibia and basitarsus each with a dense ventral brush of black setulose hairs. Anteroventral surface of front basitarsus, apical half of front tibia, and posteroventral surface of first two tarsomeres of hind tarsus with dense golden velvety pile ; vestiture of legs otherwise black. Wings uniformly dusky hyaline ; epaulet and basicostal scale yellow ; veins yellowish toward wing base, becoming dusky apically. Squamae dusky. Halteres yellow.

Abdomen mostly black. Apparent first tergum yellowish in an indefinitely delimited triangle below the scutellum ; first and second sterna except apex of latter yellow. Sides and ventral surface of apparent first tergum, first sternum, and median area of second sternum whitish pollinose ; pollen of rest of abdomen concolorous with background, the abdomen consequently subshining black dorsally and with somewhat the appearance of being " greased ". Vestiture consisting of abundant short black setulae and of longer hairs ventrally, those on the basal sterna being yellowish to whitish with a few blackish intermixed. Hypopygium more shining than rest of abdomen. Apical plate shallowly and broadly notched medially (Text-fig. 39). Length, 13 mm.



FIGS. 39–41. 39. *Bengalia subnitida*, sp. n. Apical plate and preceding sternite of male. (Bristles and setae omitted.) 40. *Metallea setiventris*, sp. n. Genitalia and third to sixth sternites of male, ventral view. (Setae and bristles omitted except on right half of third and fourth sternites.) 41. *Isomyia coei*, sp. n. ♂ genitalia spread, lateral view. (Bristles and setae of hypopygium omitted.)

FEMALE. Front broader at antennal bases, a little tapering toward vertex ; maximum width, 95 micrometer units, compared with 255 for head width. Bristles on coxae and ventral surface of sternopleuron dense, as in the male, but not nearly so long. Hind femur black only dorsally. Tibiae not villous ; front tibia and hind femur without rows of spines or spinous bristles as described for the male. Ventral brush of hind tibia and basitarsus greatly reduced. Abdominal sterna and genital segments yellow ; hairs of sterna much shorter than in male, yellowish on sternum 1, on 2 except apex, and on the median third of the remaining sterna (where they might easily be overlooked) ; otherwise black and black-setulose. Sterna 2 to 4 each with a pair of erect black bristles. Otherwise except sexually as described for the male.

Holotype ♂. E. NEPAL : Taplejung Distr., below Sangu, by stream in shady ravine, c. 6,000′, 30.x.1961 (*R. L. Coe*), B.M. (Nat. Hist.).

Allotype ♀. Same data as holotype.

The shining black abdomen separates this from other Oriental species known to me. The relationship seems closest to *B. varicolor* (Fabricius), but that species has discal macrochaetae on the apparent fourth tergum, the abdomen is pollinose, and the apical plate of the male is deeply notched. In Senior-White, Aubertin and Smart's key to the Oriental species it traces to couplet 12, but both species in that couplet (*escheri* Bezzi and *xanthopyga* Senior-White) have pale-pollinose, partly pale-coloured abdomens, different tibial armatures, only short-haired hind tibiae, mostly pale legs, and other points of variance. Séguy (1946) has described three Oriental species (*chromatella*, *pallidicoxa*, and *unicolor*) subsequent to Senior-White, Aubertin and Smart's work, but all these have discal macrochaetae on the apparent fourth tergum and, among other differences, the abdomen is either largely pale or covered with pale pollen.

Subfamily **RHINIINAE**

Idiella tripartita (Bigot)

Idia tripartita Bigot, 1874 : 236.

E. NEPAL : Taplejung Distr., Sangu, yellow blooms of cultivated composite (*Guizotia abyssinica* Cassini), c. 6,200′, 1 ♂, 16–29.x.1961 (*R. L. Coe*) ; north of Sangu, above river bank, c. 5,000′, 5.i.1962 (*R. L. Coe*).

This rather widespread but apparently uncommon Oriental and eastern Palearctic species has been recorded from China (Fukien), Sikkim, and Darjeeling by Peris (1952). As Zumpt (1956) points out, the hind tibia has a row of anterodorsals, two of which are much longer and more conspicuous than the others. The anterodorsal row, if it were well developed, would lead through Peris' and Zumpt's keys to genus *Rhinia*, rather than *Idiella*, but in this species this row, though distinguishable from the setulae of the tibia, is feeble and much less distinct than in *Rhinia*.

Stomorhina procula (Walker)

Idia procula Walker, 1849 : 808.

E. NEPAL : Taplejung Distr., Sangu, mixed vegetation by stream in gully, c. 6,200′, 2 ♀, ix–x.1961, and 1 ♂, xi.1961–i.1962 (*R. L. Coe*) ; Sangu, yellow blooms of cultivated composite (*Guizotia abyssinica* Cassini), c. 6,200′, 1 ♂, 10–16.xii.1961 (*R. L. Coe*) ; Sangu, blooms of wild cherry, c. 6,200′, 1 ♂, 15–18.xi.1961 (*R. L. Coe*).

***Metallea setiventris* sp. n.**

(Text-fig. 40)

MALE. Head mostly yellow ; parafrontals with somewhat of a brownish tinge ; parafrontals and parafacials thickly yellow pollinose ; centre of face, especially underlying antennae, whitish pollinose ; oral margin, vibrissal area, and anterior half of gena almost devoid of pollen ; occipital orbits, centre of occiput, and posterior half of gena densely whitish pollinose. Occiput mostly black, ocellar triangle blackish. Antennal bases but narrowly separated from each other, with only vestiges of a carina between them. Eyes subcontiguous, frontale completely obscured for a considerable distance. Antenna yellow, the third segment blackish externally, arista blackish ; arista pubescent half way or more, the longest hairs distinctly longer than maximum diameter of arista. Proboscis blackish ; palpi yellow, whitish pollinose only apically. Frontals 5 or 6 ; outer verticals not developed ; 2 or 3 black setulae immediately above and a row along oral margin below vibrissa ; parafrontal with several fine yellow hairs visible only on close examination under high magnification ; a few minute black setulae along frontal row ; postoccipital row black, other occipital and genal hairs yellow.

Thorax metallic green, mesonotum and parts of pleura strongly coppery in certain lights, scutellum with but traces of a coppery sheen ; mesonotum quite distinctly whitish pollinose, the setulae and bristles arising from small bare black spots. Bristles black ; setulae of mesonotum, scutellum, humerus except below, extreme anterodorsal corner of mesopleuron, and anterior face of sternopleuron black, setulae and hairs otherwise whitish to yellow. Femora black with greenish to coppery reflections ; tibiae yellow, becoming blackish to black on apical third to fourth, especially below ; all basitarsi and second tarsomere of hind tarsus yellow, the apex of each segment blackish, remainder of tarsus black. Middle tibia with one anterodorsal. Pile of legs black. Wing hyaline, somewhat infuscated toward costa and especially near apex ; veins yellow at base, otherwise brownish.

Abdomen largely yellow ; apparent fourth tergum and hypopygium green with coppery reflections ; a median longitudinal black spot on each of first four apparent terga, each spot almost connected with those on adjacent segments so as to form a narrow longitudinal band from the base of the abdomen to about the middle of the fourth tergum (where it interrupts the green background). First four sterna yellow ; fifth and sixth (pre-genital) black ; external genitalia mainly black. Setulae and pile mostly black ; first two sterna and ventral surfaces of first three apparent terga wholly with fine yellowish hairs ; apex of second sternum with a row of 5 or 6 slender black bristles ; third and fourth sterna on their apical half with numerous long setulae and bristles, those on the sides, especially on sternum 3, being particularly long (Text-fig. 40). Fifth sternum subshining ; lobes of pregenital sternite rugulose, with moderately abundant black hairs and setulae ; outer forceps more finely rugulose, glabrous at their bulbous base.

Length, 5 mm. Measurements in micrometer units (60 = 1 mm.) : head width, 61 ; width of parafacial, 7, of frontale, 1·5 ; distance vibrissa to nearest part of eye, 13, vibrissa to oral margin 6, distance between vibrissae, 15.

Holotype ♂. E. NEPAL : Taplejung Distr., Dobhan, cut rice steppes above River Maewa, 4,000′, 28.i.62 (*R. L. Coe*), B.M. (Nat. Hist.).

This small fly superficially resembles *Rhynchomyia setipyga* Villeneuve, but upon closer inspection it is different in many respects. The pilose propleuron places it in

Metallea, according to Peris' interpretation of this genus ; in Senior-White, Aubertin & Smart's key it runs to *Metalliopsis*, which Peris considers a synonym of *Metallea*, but those authors, as shown by Peris, have confused three species which they cite in synonymy. In Peris' key to *Metallea* this species traces to *setosa* Townsend on the basis of its distinctly pubescent arista and the presence of only one anterodorsal on the middle tibia. However, *setosa* is a distinctly larger species, with a different coloration (notably a more distinctly green mesonotum and black parafacials with a polished spot on the lower part of each) ; also, in *setosa* the remarkable setation of the sternites is lacking.

Metallea setosa (Townsend)

Metalliopsis setosa Townsend, 1917 : 198.

E. Nepal : Taplejung Distr., above Sangu, edge of mixed forest, c. 6,500′, 1 ♂, 17.x–1.xi.1961 (*R. L. Coe*) ; Sangu, mixed vegetation by stream in gully, c. 6,200′, 1 ♂, ix–x.1961 (*R. L. Coe*) ; Sangu, yellow bloom of cultivated composite (*Guizotia abyssinica* Cassini), c. 6,200′, 1 ♀, 16–29.x.1961 (*R. L. Coe*).

Rhynchomyia setipyga Villeneuve

Rhynchomyia setipyga Villeneuve, 1929 : 185.

E. Nepal : Arun Valley, Tumlingtar, yellow blooms of cultivated composite (*Guizotia abyssinica* Cassini), plateau, c. 2,000′, 10 ♂, 1 ♀, 8–25.xii.1961 (*R. L. Coe*) ; Taplejung Distr., Dobhan, cut rice steppes above River Maewa, c. 4,000′, 1 ♂, 28.i.1962 (*R. L. Coe*).

This species was described from Formosa, and Peris (1952) considers that *Musca collecta* Walker, 1860, known only from the badly broken type from Macassar, may be a synonym. *R. setipyga* cannot be a synonym of *Metalliopsis setosa* Townsend, as so considered by Senior-White, Aubertin & Smart.

The present series seems to be this species, the only discrepancy that I can find being the lack of the triangular brownish area which Villeneuve describes as occurring below each eye. The arista is short-pubescent, though the pubescence is distinct ; the parafacials and parafrontals have a few fine yellow hairs which are difficult to see because of their texture and similarity in color to the background ; the female has a few black frontal setulae. The femora of the male are wholly black except at the extreme apex ; those of the female are black on the apical half. The abdominal pattern is variable, but the abdomen is predominantly yellow, with a black apex (beyond the third apparent segment), which is largely obscured by yellow pollen ; usually a median polished abdominal black band, extending over the apparent second to fourth terga (and interrupting the pollinose area of the latter), together with a transverse band at the apex of the third tergum, give the effect of a cross. The male genitalia are as illustrated by Peris ; particularly, the processes of the pregenital sternite are elongated, with a patch of approximately six erect spines near the base of each.

Isomyia coei sp. n.

(Text-fig. 41)

MALE. Head mostly black, face below yellowish, oral margin yellowish to reddish yellow; covered with pollen, mostly dense (that of the face rather sparse), except on the usual bare area of the upper occiput, which is shining black; pollen in general cinereous below, becoming yellowish on the parafacials and parafrontals. Hairs of parafacials and parafrontals short, inconspicuous, mostly pale, some black on the parafrontals and parafacials below. Genal and occipital pile white. Front at narrowest about width of ocellar triangle; frontal stripe narrow but distinct throughout. Antennae yellowish to reddish yellow; apical half of third segment darkened; arista black. Palpus spatulate, yellow, with black setulae. Proboscis black.

Thorax metallic green, with bronze reflections especially along the acrostichal, dorsocentral and intra-alar areas, on the disc of the scutellum, and on the middle of the mesopleuron and sternopleuron. Scutellum about 1·3 as broad as long. Mesonotum and scutellum with short black setulae; pleura mostly whitish pilose; some black setulae on upper part of mesopleuron. Spiracles black haired. All bristles black. Dorsocentrals 2 : 4, acrostichals 2 : 2, mesopleurals 5. Postalar declivity bare. Legs black, tibiae and base of hind basitarsus reddish brown. Middle tibia without a ventral bristle; front tibia with anterodorsal row developed for about three-fifths length of tibia. Wings subhyaline; stem vein with 3 to 6 long setulae above, bare below; *r–m* opposite end of Sc_1; bend of M_{1+2} broadly rounded, the apical cell narrowly open. Epaulet black; basicostal scale yellow. Squamae white with narrow yellow rims; thoracic squama not lobulate posteriorly and distant from the scutellum.

Abdomen green, with bronze reflections dorsally, mostly densely whitish pollinose and with black setulae and bristles. Some whitish hairs on first sternum and apparent first three terga ventrally toward the sterna. Lobes of pregenital sternite rounded apically. Anterior claspers slender, but slightly bowed apically; paralobes slender, parallel-sided, rounded apically, with erect setulae ventrally (Text-fig. 41). Length, 7–8 mm.

Measurements of holotype in micrometer units (60 = 1 mm.): head width, 145; width of vertex, 24, of front (minimum), 4, of frontal stripe (minimum), 2, of parafacial opposite antenna, 18, of parafacial opposite vibrissa, 15; distance between vibrissae, 28; length of third antennal segment, 20.

FEMALE. Gena black as in male, or sometimes more or less reddish yellow anteriorly. Front tapering from vertex to opposite lunule, then broadening rapidly. Frontal stripe reddish brown, on an average about one-third width of front, almost parallel-sided and consequently occupying a greater percentage of the front above and a smaller percentage below. Acrostichals usually 1 : 2. Otherwise except sexually as described for the male. Measurements in micrometer units: head width, 170; width of vertex, 42, of front half way between anterior ocellus and lunule, 55, of parafacial opposite antennae, 25, of parafacial opposite vibrissa, 17.

Holotype ♂. E. NEPAL: Arun Valley, Tumlingtar, plateau, c. 2,000′, yellow blooms of cultivated composite (*Guizotia abyssinica* Cassini), 16–29.xii.1961 (*R. L. Coe*), B.M. (Nat. Hist.).

Allotype ♀. Same data, except 10–16.xii.1961.

Paratypes, 1 ♀, same data as holotype; 1 ♂, 3 ♀, same data as allotype; 1 ♂, same data as holotype except 8–25.xii.1961.

This species belongs to the *dubiosa* group of Peris (1952) and runs in that author's key to *pseudonepalana* (Senior-White, Aubertin & Smart), the only Oriental species which Peris refers unquestionably to that group. The elongated, oval lobes of the pregenital sternite readily differentiate it from *pseudonepalana*, and the genitalia differ in other respects.

Isomyia pseudoviridana (Peris)

Thelychaeta pseudoviridiana Peris, 1952 : 180.

E. Nepal : Taplejung Distr., Sangu, yellow blooms of cultivated composite (*Guizotia abyssinica* Cassini), c. 6,200′, 8 ♀, 2 ♂, 12–29.x.1961 (*R. L. Coe*) ; Sangu, mixed vegetation by stream in gully, c. 6,200′, 3 ♀, 2 ♂, xi.1961–i.1962 (*R. L. Coe*) ; north of Sangu, above river bank, on flowers of shrub, c. 5,000′, 2 ♀, 2 ♂, 5.i.1962 (*R. L. Coe*) ; Dobhan, on minute florets of " tassel-flowered " shrub, c. 3,500′, 2 ♂, 23–31.i.1962 (*R. L. Coe*).

Isomyia electa (Villeneuve)

Thelychaeta electa Villeneuve, 1927 : 217.

E. Nepal : Taplejung Distr., between Sangu and Tamrang, mixed shrubs in deep gorge, c. 5,200′, 1 ♂, x–xi.1961 (*R. L. Coe*) ; Sangu, yellow blooms of cultivated composite (*Guizotia abyssinica* Cassini), c. 6,200′, 2 ♀, 16–29.x.1961 (*R. L. Coe*).

Strongyloneura (? prolata (Walker)***)***

Idia (*Rhyncomyia*) *prolata* Walker, 1860 : 133.

E. Nepal : Taplejung Distr., between Sangu and Tamrang, mixed shrubs in deep gorge, c. 5,200′, 1 ♀, x–xi.1961 (*R. L. Coe*) ; Sangu, mixed vegetation in stream by gully, c. 6,200′, 1 ♀, ix–x.1961 (*R. L. Coe*).

Reference of the above specimens to *prolata* is made with some question because of the lack of males. Only one other species of the genus is recognized as valid by Peris, namely *S. prasina* Bigot, the type species, from Formosa and Japan. Peris' criterion for the separation of the species, whether the polished black genal spot reaches the eye (*prolata*) or not (*prasina*), would place these specimens in the latter species, though I am inclined to believe, on the basis of abdominal coloration and known geographical distribution, that they belong in the former.

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REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE)

PART II

BRITISH MUSEUM
20 OCT 1964
NATURAL HISTORY

V. G. L. VAN SOMEREN

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ENTOMOLOGY Vol. 15 No. 7
LONDON: 1964

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The Sanctuary, Ngong, Kenya

Pp. 181–235 : 23 *Plates* ; 4 *Maps*

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REVISIONAL NOTES ON AFRICAN *CHARAXES* (LEPIDOPTERA : NYMPHALIDAE) PART II

By V. G. L. van SOMEREN

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SYNOPSIS

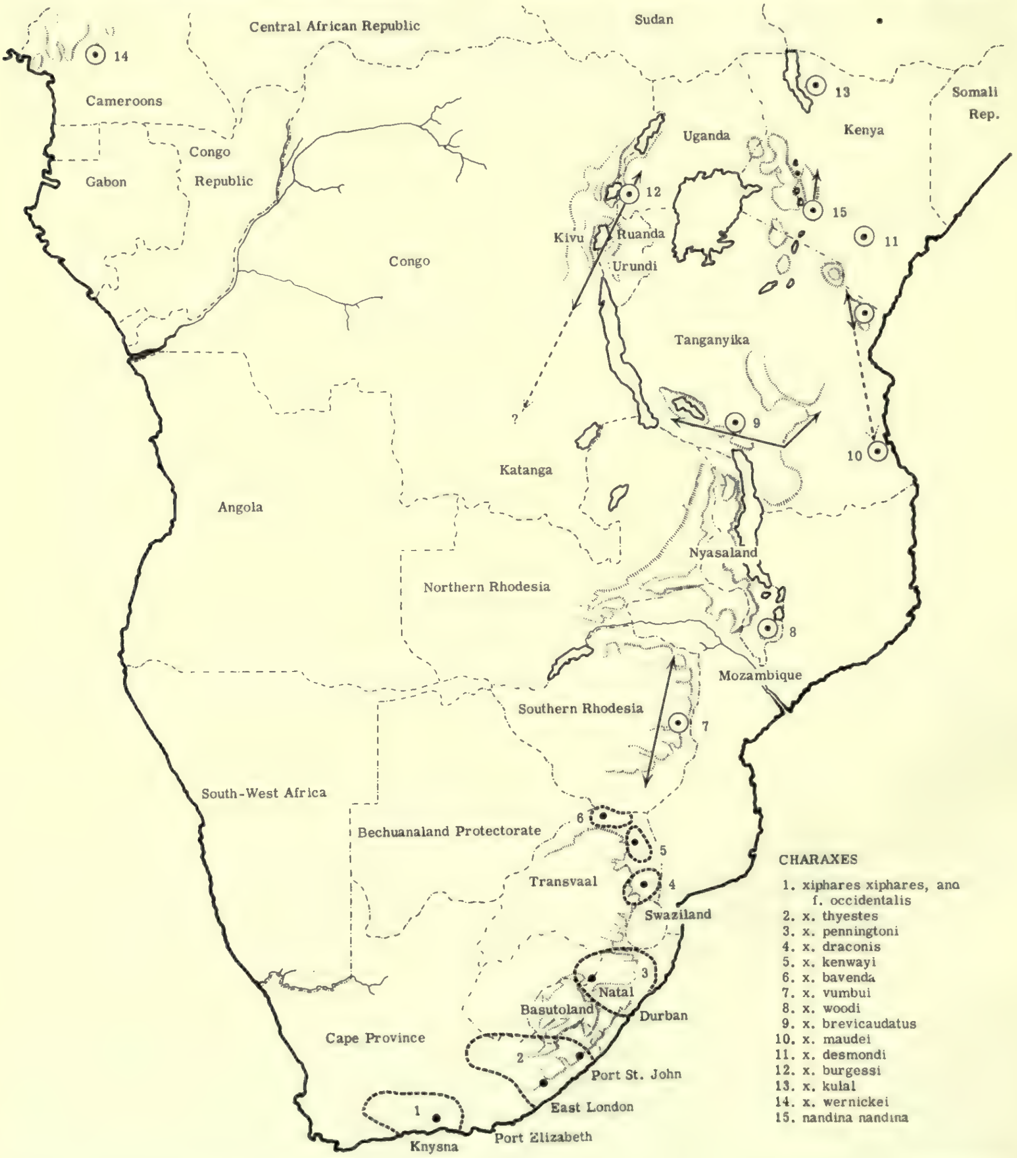
One complex and the subspeciation in two species of the genus *Charaxes* are dealt with in which eight new subspecies and one new form are described and one name elevated to its original status and one new combination given.

1 The *CHARAXES XIPHARES* COMPLEX

Up to the time of publication of the *Charaxes* section by Aurivillius, in " Seitz ", African Rhopalocera 1911, only one race of *Charaxes xiphares* (Cramer) was recognized, the name *thyestes* Stoll, 1790, being placed as a synonym. Thereafter, several races were described, notably by Rothschild, Jordan, Poulton, Carpenter and van Son.

After the lengthy description of *xiphares vumbui* by van Son (1936 : 201), Carpenter in the same paper lists the various races of the species, arranging them geographically. He retains the name *reducta* Rothschild for the race inhabiting " Caffraria " . . . Natal to Knysna, and the name *elatias* Jordan, for the race occupying the forests of West Pondoland, Natal and Zululand. By so doing he accepts *thyestes* Stoll as being a synonym of the nominate *xiphares* which has a range from Knysna to " west South Africa ".

Carpenter states "there is no record of *xiphares* from Nyasaland" unless *brevicaudatus* Schultze from Manow is placed to *xiphares*. Manow, however, is not in Nyasaland, but north of Lake Nyasa in Tanganyika Territory, between Rungwe and Poroto Mts. Carpenter placed *maudei* Joicey & Talbot to *xiphares*, following the same allocation proposed by Joicey & Talbot (1922 : 337). He also accepts Poulton's suggestion that *nandina* Rothschild & Jordan is a race of *xiphares*.


Central African Republic
Sudan
14
13
Cameroons
Somali Rep.
Kenya
Uganda
Congo Republic
Gabon
12
15
11
Kivu
Ruanda
Urundi
Congo
Tanganyika
?
9
10
Katanga
Angola
Nyasaland
Northern Rhodesia
8
Mozambique
Southern Rhodesia
7
South-West Africa
6
5
Bechuanaland Protectorate
4
Transvaal
Swaziland
3
Natal
Basutoland
Durban
Cape Province
2
Port St. John
East London
1
Knysna
Port Elizabeth
CHARAXES
1. xiphares xiphares, and f. occidentalis
2. x. thyestes
3. x. penningtoni
4. x. draconis
5. x. kenwayi
6. x. bavenda
7. x. vumbui
8. x. woodi
9. x. brevicaudatus
10. x. maudei
11. x. desmondi
12. x. burgessi
13. x. kulal
14. x. wernickei
15. nandina nandina

MAP 1. Sketch map of Southern, East and Central Africa, showing distribution of *Charaxes xiphares* and subspecies.

Charaxes x. wernickei Joicey & Talbot, known only from a single female type, said to have come from Cameroons, is accepted without comment.

In 1937, Jordan sank his name *elatias* as a synonym of *reducta* Rothschild (1937 : 324), making no further comment.

Dr. van Son (1953) published a comprehensive review of the species. He limits the range of the nominate subspecies, including the form *occidentalis*, to Cape Province from Swellendam to Port Elizabeth. He revives the name *thyestes* Stoll for the race inhabiting " Eastern Cape Province " from Pondoland to Port St. Johns, placing *reducta* and *elatias* as synonyms. He thus upsets the range of *elatias* Jordan =*reducta* Rothschild, as given by Carpenter, which included Natal and Zululand, and pointed out that the race inhabiting Natal and Zululand was distinct from *thyestes*, and he named it *penningtoni*. The three Transvaal races remained unchanged (except for the description of "forms") i.e. *draconis*, *kenwayi* and *bavenda;* the southern Rhodesian race, *vumbui* is upheld.

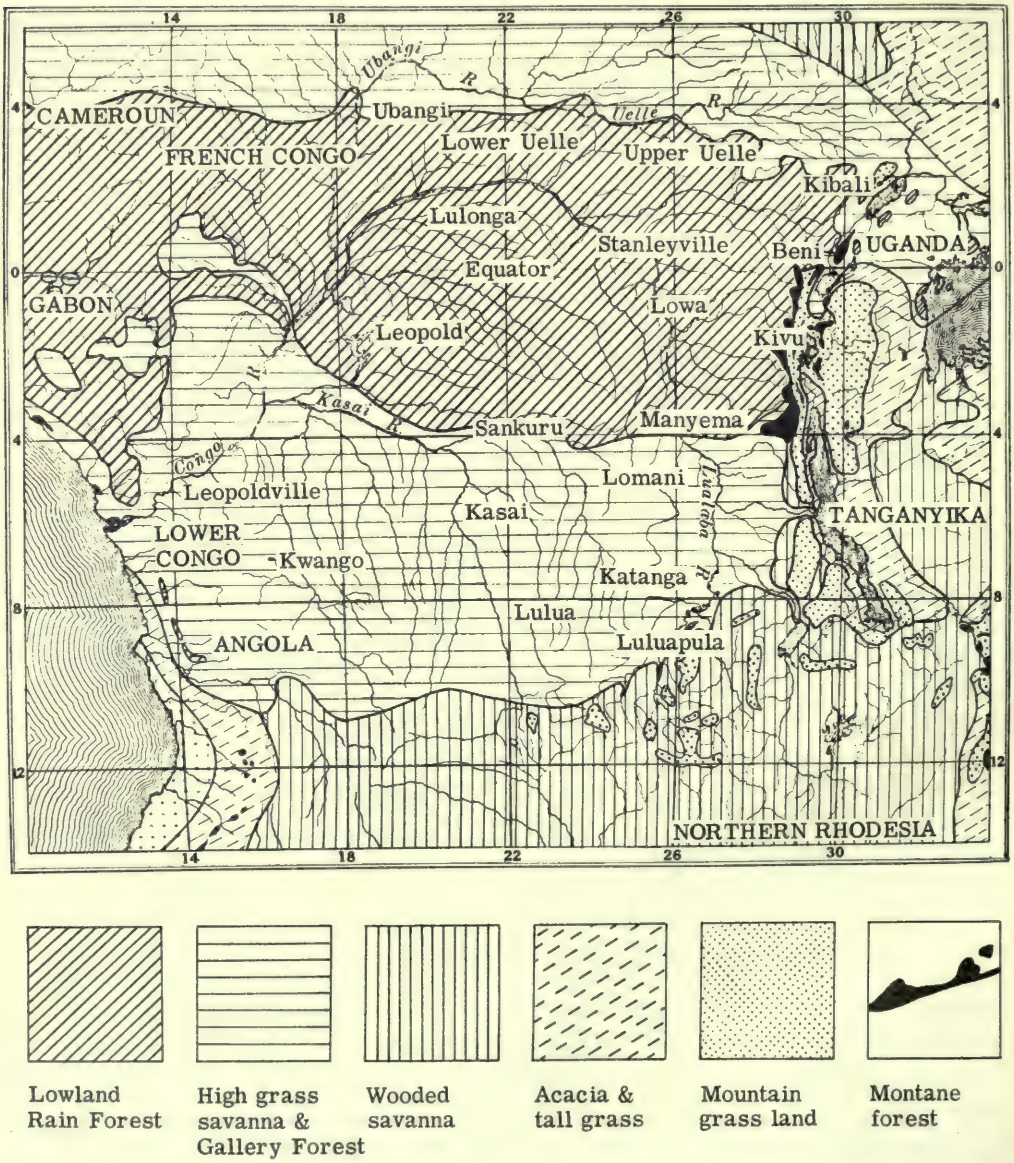
Having gone very carefully into the early published records of *xiphares* in South Africa, Dr. van Son then makes two very important points : that nominate *xiphares* was taken in the Cape Province west of Port Elizabeth, and that a form of it existed further west in the Swellendam district (f. *occidentalis* van Son), thus over-riding the opinion of Rothschild, 1929 : 481, that the name *reducta* Rothschild (syn. *elatias* Jordan) actually applied to an eastern race which had already been named *thyestes* by Stoll, the type of which came from " Caffaria " i.e. " east of Bruintjes Hoogte in the present Somerset East district ".

An examination of material from these areas seems to indicate that the characters on which the two are separated are not so well defined as is indicated in the descriptions, in fact, both races are somewhat variable in series, and might be united were it not for the fact that each has a variant peculiar to itself and that their areas of distribution are separated by a wide belt of dry karroid country unsuited to *xiphares*, thus ensuring reproductional isolation ; moreover, both Rothschild and Jordan, independently of each other, designated the eastern Cape Province insect by racial names . . . but the differences are slight.

Dr. van Son places *brevicaudatus* Schultze, as a race of *xiphares*, thus disassociating it from *cithaeron* of which it had been described as a variety. The type is a female (not male, as given by van Son). He then gives a reference to a male described by Rebel (1914 : 254), but apparently he did not study the original description very carefully, nor the figures, from which it is apparent that Rebel had before him two lots of males, four from N.W. Lake Tanganyika, one from Manow and one from Iringa. The latter two are true *brevicaudatus*, but the four from north west of Lake Tanganyika belong to another race, which van Son himself subsequently described as *burgessi*. Unfortunately, van Son repeats the error that Manow, the type locality of *brevicaudatus*, is in Nyasaland, whereas it is in Tanganyika.

He cites the male mentioned by Schultze as from Iringa, also three others from Tanganyika . . . " Rungwe Mts. and Morogoro-Korogwe Rd." but does not give a full description which might have clarified the composite one given by Rebel which was based on two races.

Dr. van Son excludes certain other " species " which had been placed to *xiphares*. Thus he discounts the suggestion made by Joicey & Talbot (1922 : 337) that *Charaxes maudei* Joicey & Talbot was another female of *brevicaudatus*, based on the evidence of a male (no locality given, other than Tanganyika) which they associated with their *maudei*, and which they said agreed with the figure of the male *brevicaudatus* given by Rebel (1914 : 254). Since we now know that the male of *maudei* is quite distinct, this is undoubtedly a male *brevicaudatus*.


14
18
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8
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Ubangi R
Uelle R
CAMEROUN
Ubangi
Lower Uelle
Upper Uelle
FRENCH CONGO
Kibali
Lulonga
Stanleyville
Beni
UGANDA
Equator
GABON
Lowa
Leopold
Kivu
R
Kasai R
Sankuru
Manyema
Congo
Lomani
Lualaba R
Leopoldville
Kasai
TANGANYIKA
LOWER CONGO
Kwango
Katanga
Lulua
ANGOLA
Luluapula
NORTHERN RHODESIA
Lowland Rain Forest
High grass savanna & Gallery Forest
Wooded savanna
Acacia & tall grass
Mountain grass land
Montane forest

MAP 2. Vegetational map of the Congo. (After Chapin.) Administrative districts indicated.

The type of *brevicaudatus* Schultze is a perfect female, now before me, and has very short tails, that of *maudei* has very long tails, and for this and other reasons van Son places *maudei* to the species *cithaeron* Felder, in spite of the fact that a race of *cithaeron* occurs in the same area but in a slightly different biotope. (For this same reason van Son gave it as his opinion (*in lit.*) that my recently described *Ch. kulal* (1962 : 45) also belonged to *cithaeron.*) Form and length of tail, in both male and female, are not of major significance in differentiating species, for there is some degree of variation in a given subspecies ; nevertheless, it is a morphological character of importance, often associated with environment. In the *xiphares* complex there are conspicuous features amongst its members which at first sight seem to suggest that the species can be divided into two main groups : A—those with very short thick tails in both sexes ; B—those with very long thin tails ; then again : a—those in which the females have a limited number of white spots in the fore wing discal bar, accompanied by an ochreous hind wing discal patch ; b—those in which the fore wing bar is more or less complete and the hind wing patch whitish, bluish-white to violet-blue. Similarly, in the male sex, whereas the southern races have the hind wing patch strongly blue and somewhat restricted, the discal blue becomes larger and more whitish-blue as the races range northward. Unfortunately, this tail-length character and colour division break down if we arrange the races in geographical sequence. Thus, although the races of the south, subject to continuous rainfall throughout the year, exhibit ochre-yellow discal patches in the hind wing of the females, those of the areas with summer or seasonal rain, tend to vary in the colour of the hind wing patch from ochre to whitish, often tinged with blue. This dichromatic variation seems to start in the Natal area and becomes more pronounced as the Transvaal is reached, then in Southern Rhodesia, the ochre phase is eliminated and the females are monochromatic, with a bluish-white to violet-blue hind wing patch and a complete fore wing discal white bar, that sometimes has an ochre-yellow tinge.

However, there would appear to be one exception to this general trend, for in the female of *nandina* Rothschild & Jordan, of the Kenya Highlands, the hind wing patch is always ochre, and in the male the hind wing discal patch is restricted but has an additional row of post-discal blue spots. This sudden reappearance of a type suggestive of the southern races of *xiphares* is disconcerting and one is forced to consider whether *nandina* is a *xiphares* retaining an ancestral character, or if it is a distinct species. My personal view is that *nandina* is a distinct species, and that the ochre patch in the hind wing of the female is not a recrudescence of an ancestral character ; moreover, I suggest that the more ancestral members of the " *xiphares* complex " are those within the northern range of its distribution and that the southern representatives have evolved the darker coloration due to climatic and other ecological factors. It is interesting to note that although hesitant about including *nandina* as a race of *xiphares* as was proposed by Poulton, Dr. van Son very reluctantly does so, but cites major, very obvious, differences between *nandina* and *xiphares*, in both sexes.

It must be noted that up to the time when van Son wrote his revision, comparatively little material of the northern races existed, in some cases only a single specimen was on record, and not available for examination. The position has now greatly improved and with the acquisition of additional material and data, it seems necessary to re-orientate our views on the relationship of the various elements which go to make up this complex.

On the evidence provided by a consideration of the distribution and the gradual transition, in the main, of one type of coloration to another, and despite tail length, it is reasonable and compatible with evolutionary trends, to consider all members of this complex as belonging to one species *Ch. xiphares*, with one or possibly two exceptions, which are dealt with in detail hereafter.

With the ready co-operation of museums and individuals I have now brought together types or topotypes (and photographs of types) and much additional material, and now submit my views, using Dr. van Son's valuable paper as a basis for discussion.

DESCRIPTIONS AND NOTES

Charaxes xiphares xiphares (Cramer)

(Pl. 1, figs. 1 and 2)

Papilio xiphares Cramer, 1781 : 171.

MALE. Fore wing length 40–43 mm., outer margin rather strongly concave above vein 2 ; hind wing margin rather crenulate at veins. *Upperside*. Ground colour blue-black with strong blue sheen especially in basal area of fore wing, base of hind wing more brownish. Fore wing with two rows of blue spots, the inner discal row made up as follows : two spots just beyond cell, upper one small and linear, the lower one larger and more oval, followed by a larger more vertical spot sub-basal in 3, then a more elongate spot in 2, one or two smaller spots in 1b, then an elongate mark in 1a at hind margin ; a complete row of postdiscal spots, the two subapical ones white, the others blue, increasing slightly in size and reaching the large linear mark at hind angle ; margin with a series of small ochre internervular spots. Hind wing with a blue discal band stretching from costa to 1c where it merges into the grey-brown of the inner fold, widest at 4, inner edge almost straight, outer edge angled at 4 ; border blue-black with a complete row of submarginal blue spots, double at anal angle ; admargin with a series of blue and golden lunules ; tail at 4, 5 mm., lower tail shorter and slightly outward curved. *Underside*. Strongly variegated ; basal area of fore wing light olive-brownish distally and sharply defined by wavy black lines, white inwardly ; two black lines, outlined with white, cross the basal half of the cell ; the distal portion of the cell darker olive-brown, the apex of the cell defined by a black line, and just beyond the ground colour is lighter olive-brown. The disc of the wing is dark olive-brown to a distance corresponding to the postdiscal spots of above, but on this surface the spots are : two subapical spots white, rest golden ochreous ; within this dark area are lunate white marks, inwardly outlined in black crossing areas 1b, 2 and sub-basal in 3, the line in 3 shaded light olive-brown outwardly. Beyond the postdiscal line the wing is light olive-brown, slightly darker toward margin, with marginal internervular ochreous spots, most pronounced at the hind angle ; a large double black spot at the tornus surrounded by a pale purply ground colour in 1b, and in 2 above another more angular black mark. Hind wing ground colour in basal half olive-grey-brown, slightly darker distally and traversed by wavy black lines in cell and sub-basal in 6–7 ; discal area with an irregular zigzag whitish bar accentuated inwardly by a narrow black line but shaded distally with greyish-brown up to the row of lunate olive-ochreous postdiscal spots which are more or less margined in black ; the border of the wing lighter olive-brown with a complete series of whitish lunules outwardly shaded in violet, with double spot at anal angle ; admarginal lunules greeny-ochreous, more greenish at anal angle ; margin greyish to black along tails ; fringe white.

FEMALE. Fore wing length 50 mm. *Upperside.* Ground colour very dark brownish-black (tending to more brownish in old specimens); fore wing markings more or less as in the male but discal spots larger, spots beyond the cell end usually three in number, the sub-costal one narrow and linear, the next two more triangular, with base towards cell; next spot set based in 3 more quadrate, that in 2 longer and angular and touching the post-discular series of which the two sub-apical ones are large and white, the remainder smaller and increasingly more ochreous and rather ill-defined, that on the hind margin more elongate; marginal internervular spots absent except for the double one at the tornus. Hind wing with discal ochreous patch commencing as a single spot at about mid-costa, then increasing in width to 4 then narrowing and merging into the inner fold above the hind angle; distal border with a series of small internervular violet-blue spots, double at anal angle; admargin with golden-ochreous lunules from anal angle to 6; margin black; tail on 4, about 7 mm., the lower tail shorter and outwardly curved. *Underside.* As in the male, but ground colour slightly more greyish-brown; fore wing discal and post-discal marks whitish and more pronounced. Hind wing whitish discal bar broader and more pronounced and bordered by larger and stronger ochreous lunules; admarginal lunate marks stronger.

♂ form **occidentalis** van Son

Charaxes xiphares ♂ f. *occidentalis* van Son, 1953 : 223.

MALE. *Upperside.* Very similar to the nominate form but differing chiefly in slightly smaller size and in the admarginal lunules of the hind wing being strongly blue; underside more greyish.

FEMALE. *Upperside.* Pattern very similar to nominate race but spots in 1b prominent; post-discal spots and marginal dots all present; discal yellow suffusion in supramarginal area small. Hind wing, light discal area narrower, outer border very even. *Underside.* Ground colour both wings fuscous; dark areas in disc of fore wing and internal to discal white line on hind wing darker and more in contrast. Hind wing black edging of discal streaks obsolete with intervening space between discal and post-discal streaks lighter and much wider in anal angle; submarginal spots less prominent.

No specimens are available; the description is based on that of van Son.

Range: The nominate race ranges from Knysna eastward to Port Elizabeth, and the form *occidentalis* from west of Knysna to Swellendam district. To quote Dr. van Son, " there are no geographical barriers sufficiently great to ensure reproductional isolation of *xiphares* from as far west as the forests of the Swellendam district to as far east as Van Stadens near Port Elizabeth ".

Charaxes xiphares thyestes (Stoll)

(Pl. 1, figs. 3–8)

Papilio thyestes Stoll, 1790 : 144.
Charaxes xiphares reducta Rothschild, 1929 : 481.
Charaxes xiphares elatias Jordan, 1963 : 331.

MALE. Fore wing length 42 mm.; outer margin strongly concave at vein 4. *Upperside.* Ground colour black with dark blue sheen in certain lights. Fore wing with discal and post-discal blue spots as in the nominate race (as in type *elatias*) or spots in 2–5 absent or hardly visible (as in type *reducta*); marginal ochreous spots distinct. Hind wing discal blue area variable but usually larger than in nominate race, less straight on inner edge and irregularly indented on outer margin; submarginal blue spots in black border well developed, and marginal lunules widely golden-ochreous; margin dentate at end of veins; upper tail robust, 5 mm., lower tail much shorter. *Underside.* Pattern as in the nominate race but less strongly varigated, the discal light areas being suffused with more greyish-brown and in less contrast; the admarginal black spots in hind wing rather more strongly marked whilst the dark lunate marks on outer edge of discal band also strongly marked. The tornal spots in fore wing more solid and the larger one only slightly indented on outer side; black bars at base of fore wing usually thick.

FEMALE. Fore wing length 50 mm. *Upperside.* Ground colour black to brownish-black; post-discal spots may be limited to two or three in the subapical area, the rest absent or faintly indicated; the discal white spots rather smaller than in nominate race, that in 1a hardly visible. Hind wing ochreous discal area usually large, but rather variable; spot below costa often whitish; discal patch sometimes pale, but seldom whitish; submarginal blue spots tend to be elongate; admarginal golden-ochreous lunules well marked; upper tail 7 mm., lower tail short 3–4 mm. almost straight. *Underside.* Colour and pattern as in nominate race, but often slightly darker, and pale areas less in contrast; tornal dark spots in fore wing well developed, often carried up to 3; dark spots distal to the discal bar in hind wing well developed, especially in region of anal angle.

Range: "In all forests of the eastern Cape Province including Pondoland: Zourberg, Hogsback, Katberg, Somerset East, Pirie forest, Port St. Johns" (teste van Son). There is a wide area of dry karroid country between the habitats of the nominate race and *thyestes* which is an effective barrier between the two races.

Charaxes xiphares penningtoni van Son

(Pl. 2, figs. 9–14)

Charaxes xiphares penningtoni van Son, 1953 : 225.

This race has a considerable altitudinal range from about 1,000–4,000 ft. in the region of the National Park. There is thus some variation in size in both sexes, the larger and finer specimens coming from the higher altitudes as a rule, but the pattern and colour characters remain fairly constant. Males from Eshowe have fore wing lengths of 38–45 mm., females 41–48 mm., compared with males of 42–46 mm. and females 52–55 mm. from higher altitudes.

I propose to quote from the original descriptions of the two sexes.

Description of holotype ♂. Apex of fore wing and the angle of outer margin at end of vein Cu_2 more rounded than in the two foregoing subspecies, and tails of hind wing shorter, though longer than in following subspecies. *Upperside.* Fore wing discal spot M_2 distinctly longer than M_3 (being produced basad). Hind wing blue discal area broader and much more even than in either *x. xiphares*, *x. thyestes* or *x. draconis*; its outer edge straight between RS and M_2 and also between M_2 and Cu_2; hairs between Cu_2 and anal fold much darker than in all other subspecies. Submarginal blue spots rounder than in other subspecies. Marginal lunules blue as in extreme western specimens of *xiphares* (in some paratypes they are more or less suffused with orange-yellow). *Underside.* General colour much darker than in other subspecies, especially the space between the median and discal streaks of both wings. *Length of forewing:* 45 mm. Antenna-wing ratio: 0·47.

Description of allotype ♀. *Upperside.* Discal spots below vein Cu_2 reduced to a minute white dot placed below outer edge of spot in Cu_2 (in some paratypes this dot is absent); marginal spots limited to area A_2. *Hind wing:* Light discal area much smaller than in other subspecies, its outer edge diffuse, but not crenulate; it is suffused with black near its posterior angle along vein Cu_2; submarginal spots streak-like. Tails shorter and broader than in *x. thyestes*. *Underside. Fore wing:* Area between median streaks and white discal band and the space between the latter and post-discal series strongly suffused with dark fuscous-black ; black portion of all transverse streaks very heavy. *Hind wing :* Ground colour very dark throughout, especially from base to as far as the discal band ; outer edging of post-discal lunules very much thickened and deep black. *Length of fore wing :* 51·5 mm. Antenna-wing ratio : 0·39 in.

The above description of the male applies to most examples from the higher areas, but in a long series before me, there is considerable variation not only in size and blue markings but in the length and thickness of the tails. Although the original description fits a majority of the typical female form, many specimens in a long series show variations in some respects. Thus in some specimens the fore wing post-discal series of spots is complete ; the spot below vein Cu_2 may be large ; the hind wing ochreous patch is often large, the outer edge defined and irregular ; in some specimens, the sub-marginal blue spots are large, or they may be hardly visible ; the tails may be short and thick, or longer and thinner. In some specimens the fore wing discal spots may be creamy or pale ochreous.

♀ form ***luminosa*** van Son

(Pl. 2, fig. 9)

Charaxes xiphares penningtoni ♀ f. *luminosa* van Son, 1953 : 226.

The chief character of this form is the white, instead of an ochreous, discal patch in the hind wing. The original description is as follows :

> " Like the type form, from which it differs in the hind wing light area being white with a distinct lavender-blue gloss, irrorated along its outer edge with violet-blue scales ; and in the presence of yellow marginal spots in the fore wing, which are, however, very minute in areas Cu_2 and obsolete between M_2 and the apex. . . "

In the specimen before me, the hind wing submarginal blue spots are large and the marginal golden-ochreous lunules are well marked.

Range : This subspecies occurs in all the higher forests of the Natal district, but as already indicated, has a considerable altitudinal range. I have examined specimens from the National Park and Champagne Castle, Bulwer, Kloof, Dargle, Balgowan and Eshowe. There appears to be a break between this subspecies and *thyestes* to the south.

Charaxes xiphares draconis Jordan

(Pl. 2, figs. 15, 16 ; Pl. 3, figs. 17, 18)

Charaxes xiphares draconis Jordan, 1936 : 331. [♂, ♀]

MALE. Fore wing length 40–45 mm. ; margin not strongly concave. *Upperside.* Fore wing discal blue spots variable in size but usually smaller than in *penningtoni ;* marginal golden-ochreous spots present in all areas largest in 1b ; post-discal spots small. Hind wing blue discal area rather narrow and tending to be divided by dark veins in upper half ; submarginal blue spots somewhat T-shaped with stalk directed distad ; marginal lunules rather separated by dark veins, margin thus dentate ; tails usually short and stout, 3 mm. long. *Underside.* Not strongly variegated and more uniformally olive-brownish, the zigzag whitish discal lines thin ; the tornal black spots set off by a strong bluish ground accentuated by golden borders ; margin strongly ochreous.

Female. Fore wing length 50–53 mm. *Upperside.* Fore wing with large discal white spots usually in two blocks ; three spots beyond cell end, two large spots in 3–4 followed by a small white dot in 2, and obscure ochreous spots in 1a–1b, that in 1a elongate along the hind margin ; post-discal spots, three upper ones white and large, remainder tending to be obscured and ochreous in colour ; margin with obscure ochreous spots, most apparent at the tornus. Hind wing with a large rather pale, less golden discal patch represented at the costa by one spot ; outer edge slightly irregular ; submarginal blue spots large, angular or T-shaped, stalked distad ; margin with golden-ochreous lunules tending to be separated by dark veins ; tails short, thick-set, upper one 5 mm. *Underside.* Very similar to the male, more uniformly brownish in ground colour, with dark and whitish lines not strongly marked, thus not at all variegated, but fore wing white bar distinct and may be wide to area 1b.

An interesting variation has the fore wing discal bar on upper side extended through areas 2 and 1b right to hind margin (*vide* Pl. 3, fig. 18).

♀ form **candida** van Son

Charaxes xiphares draconis ♀ f. *candida* van Son, 1953 : 226.

Differs from the typical female by having the hind wing discal patch on upper side slightly smaller, white in colour with slight violet sheen around, especially distally. Submarginal blue spots as in the typical form.

Range : Forests of the Transvaal Drakensberg Range *south* of the Olifants River to Barberton district.

Charaxes xiphares kenwayi Poulton

(Pl. 3, figs. 21, 22 ; Pl. 4, figs. 25–27)

Charaxes xiphares kenwayi Poulton, 1929 : 48. [♂, ♀]

Male. Fore wing length 40–43 mm. *Upperside.* Very like *draconis*, but averaging slightly smaller ; blue spots in fore wing somewhat variable but on the whole slightly larger than in *draconis* in both discal and post-discal series. Hind wing with the blue discal band tending to be strongly indented on the outer margin, and the upper portion divided by black veins ; submarginal blue spots tending to be larger than *draconis*, but rather variable ; tails usually short and robust. *Underside.* Markedly less variegated than southern races, more uniformly brownish-drab even than in *draconis*, relieved only by dark basal lines and blackish tornal spots.

Female. This is the form with a white discal band on the upperside of hind wing. Fore wing length 45–48 mm., usually small. Fore wing discal bar white, spots beyond cell usually well developed, spots in 4–5 large, spot in 1b very small ; there may or may not be an elongate mark on the hind-margin. Hind wing discal area white with slight violet tinge, rather variable in size but usually small and hardly extending beyond vein 2, sometimes clouded over by greyish or ochreous scales in 5–6 ; submarginal blue spots not well developed and marginal lunules rather diffuse and not well defined ; tails longer than in the male, but comparatively short, upper tail 6 mm. *Underside.* Ground colour more uniform drab-brown, the discal area only slightly darker ; pale areas strongly suffused with brownish in hind wing.

Although described as the typical form, it has been found that the form *lutea* van Son with ochreous hind wing discal patch is equally common or even commoner. Form *kenwayi* corresponds to the form *candida* of subspecies *draconis*, and the form *luminosa* in subspecies *penningtoni*.

♀ form ***lutea*** van Son

Charaxes xiphares kenwayi ♀ f. *lutea* van Son ; 1953 : 227.

Fore wing length 45–48 mm. Very similar to the female form *draconis* of *xiphares draconis* but usually much smaller. *Upperside.* Fore wing discal white bar well developed and often with distinct white spots in 2 and 1b ; post-discal series white in sub-apex, then less distinct and tinged with ochre in 3–5, or the spots may be absent in these areas ; marginal ochre spots well developed. Hind wing with the discal patch often larger than in form *kenwayi* and ochre in colour ; submarginal blue spots usually large and distinct, but may be small ; marginal ochre lunules narrow but well marked and divided by ends of dark veins ; tails short and robust, 5–6 mm. long at 4. *Underside.* As in form *kenwayi*, but pale areas in hind wing larger but equally suffused with brownish ; discal fore wing bar more pronounced and often more extended into areas 1b and 2 ; marginal lunules strong.

A variation of this form has the fore wing discal spots above, creamy or even pale ochreous ; the post-discal spots ochreous.

Range : In the forests of the Wolkberg Range, Woodbush, Haenertsberg and Pietersberg to the *north* of the Olifant River.

Charaxes xiphares bavenda van Son

(Pl. 3, figs. 19, 20, 23, 24)

Charaxes xiphares bavenda van Son, 1935 : 487. [♂, ♀]

A small race.

MALE. Fore wing length 44 mm. *Upperside.* With well marked large spots in discal bar which are a brighter blue than in *kenwayi* and are extended through area 2 and 1b to the elongate spot on the hind margin ; post-discal bar may be complete or broken in mid area, two subapical spots white or bluish white, remainder often only just visible but obvious in area 1b. Hind wing blue discal area rather narrow and with distinct whitish area proximad and toward area 2, and thus shows a slight resemblance to male of *vumbui* which is considerably larger. Submarginal blue spots large and distinct ; marginal lunules golden but with a suffusion of black scaling and rather narrow ; tails short but comparatively thin, upper tail 3–4 mm. *Underside.* Not strongly variegated and ground colour generally more greyish-brown, only a slight darkening in discal area of fore wing; basal area crossed by black lines. Hind wing discal zigzag white line very thin ; margin of fore wing only slightly ochreous tinged ; tornal black marks well developed.

FEMALE. Fore wing length 47–48 mm. *Upperside.* Discal spots large and white, the three marks beyond end of cell of about equal length forming a rectangular block, set at an angle to large triangular spot in 3 ; spot in 2 more elongate, two small white spots in 1b, elongate mark on hind margin tinged ochreous. Hind wing discal patch comparatively narrow, white at costa and borders especially distal and along inner margin densely greyish or ochre scaled ; submarginal blue spots small but distinct ; margin of wing dentate, lunules narrow, tails rather short and stout, upper tail 5 mm. lower slightly shorter.

♀ form ***ochreomacula*** van Son

Charaxes xiphares bavenda ♀ f. *ochreomacula* van Son, 1935 : 489.

This form has not been examined by me but the main character seems to be that the fore wing discal spots on upperside are tinged with ochreous.

♀ form ***cyanescens*** van Son

(Pl. 3, fig. 24)

Charaxes xiphares bavenda ♀ f. *cyanescens* van Son, 1935 : 489.

This form agrees with the form *bavenda* on the upperside in respect to the fore wing spots, but the hind wing discal patch is white suffused marginally with lavender. The submarginal blue spots are more distinct and elongate ; the tails are longer, the upper one with a white streak on lower border, the lower one with the white streak on upper border ; margin bluntly dentate. This form approaches form *kenwayi* of subspecies *kenwayi* and forms a bridge towards female *vumbui*, of Southern Rhodesia.

Range : Occurs in the Entabeni area of the Zoutpansberg district of Northern Transvaal, in forest country.

Charaxes xiphares vumbui van Son

(Pl. 4, figs. 29–32)

Charaxes xiphares vumbui van Son, 1936 : 20.

MALE. Fore wing length 40–44 mm. *Upperside.* ground colour strongly blue-black, with a marked sheen, slightly greenish toward the bases of the wings. Fore wing discal blue spots well developed and extending to the hind margin where the spot in 1a is elongate, the spot in 1b more triangular, small in 2; post-discal series complete, white in the subapex then blue in 2, all well developed ; marginal golden ochreous spots small but distinct. Hind wing discal blue area large, with white sheen on posterior and inner areas, widest at 2 just below cell ; outer border indented by black veins ; represented at subcosta by one blue spot ; black border with complete series of rounded or T-shaped blue spots, double at anal angle ; margin with golden lunules well developed but separated by black vein ends ; tails short, upper 3–4 mm. lower, 2·5 mm. *Underside.* Ground colour olive-grey-brown. Fore wing discal area only slightly darker, and bordered by a zigzag black line outwardly accentuated with white and broadly shaded with ochreous distally ; post-discal olive-ochre line of lunules well marked, the subapical ones white as above ; tornal black spots well developed, strongly indented on outer edge ; black lines in basal area of wing distinct ; margin with obscure ochre-olive spots. Hind wing basal area with S-shaped olive-ochre mark outlined in black ; discal zigzag black and white line narrow extending from costa to anal angle, followed by ochreous-olive lunules, separate or contiguous in mid area from costa to anal angle, followed by a submarginal row of lilac spots outwardly dark ; margin with interrupted golden spots.

FEMALE. Fore wing length 46–51 mm. *Upperside.* Ground colour brown-black with slight purply sheen ; fore wing with strongly developed white discal bar ; three elongate spots beyond cell-end with bases square cut, spot in 4 set out at about mid-point of one above, followed by an elongate spot 3, a long oval one in 2 followed by elongate marks in 1a and 1b which may be violet tinged ; post-discal series complete, two upper subapical spots white, remainder slightly or strongly ochreous to orange, double spot at tornus ; marginal internervular spots small or hardly indicated. Some specimens have a white subcostal spot in cell. Hind wing with a large whitish discal patch, irregular in outline internally, and outwardly with strong violet suffusion extending to posterior end ; a large whitish spot at upper end of subcosta ; submarginal series of violet-blue triangular or T-shaped spots complete and double at anal angle ; margin with strongly developed golden-ochre lunules separated by dark veins, greenish at anal angle ; inner fold greyish to grey-brown. *Underside.* As in the male but fore wing white bar of above strongly represented but slightly reduced in width at hind margin. Hind wing as in the male but with a well marked white bar corresponding to the inner portion of the discal patch above ; other marks as in the male but enlarged.

Variation. A not uncommon variety of female has the large marks of the fore wing bar above, cream or ochreous. It will be recalled that similar varieties occur in subspecies *kenwayi, penningtoni, bavenda.*

Range : Occurs in the high eastern areas of Southern Rhodesia on the Vumba Mountains from Umtali to the Chirinda Forest.

This subspecies of *xiphares* is an advanced development of *bavenda* toward the more northern races and bears a strong resemblance to *Charaxes cithaeron* on the upperside.

***Charaxes xiphares woodi* ssp. n.**

(Pl. 5, figs. 35, 36)

MALE. Fore wing length 46–47 mm. (thus larger than *vumbui* or *brevicaudatus*). *Upperside.* Ground colour blue-black but with a purply sheen distad and a greeny sheen basad. Fore wing blue discal bar not very strongly developed, the spots are relatively small : two spots beyond the cell, one sub-basal in 4, one about mid-point in 3 followed by one each in 1b and 2, with an elongate spot on hind margin in 1a ; post-discal series of spots complete but not strongly marked except the two subapical white ones ; margin with well marked ochreous spots. Hind wing discal band blue with white scaling posteriorly, fairly straight on inner border, more irregular on outer ; spot at costa large ; submarginal series of blue spots large, somewhat triangular ; margin broadly golden-ochre narrowly interrupted by black veins. *Underside.* Lighter and browner than *vumbui*, but markings very similar ; tornal spots distinct ; and margin strongly orange-ochreous in hind wing ; marginal spots in fore wing comparatively large and distinct.

FEMALE. At present unknown.

Holotype male. NYASALAND : Cholo, iv.1928 (*R. Wood*). (British Museum (N.H.).)

Paratype. NYASALAND : Limbe, x.1946 (*J. D. Handman*). (National Museum, Bulawayo.)

Range : This subspecies seems to be very scarce and occurs only in the southern area of Nyasaland, so far as is known, and has been taken at Cholo by the late Rodney Wood in April 1928 and by J. D. Handman at Souche, Mt. Limbe, in October 1946.

It must be noted that *woodi* is separated from the eastern Rhodesian race *vumbui* by the wide low Zambesi Valley. It is most important to ascertain its northern range and how close it comes to ssp. *brevicaudatus* of Tanganyika Territory just north of Lake Nyasa, and the Nyika Plateau N.W. of Lake Nyasa.

***Charaxes xiphares brevicaudatus* Schultze**

(Pl. 5, figs. 33, 34, 37, 38)

Charaxes cithaeron var. *brevicaudatus* Schultze, 1914 : 3 [♀].
Charaxes cithaeron var. *brevicaudatus* Schultze ; Rebel, 1914 : 254 [♂, in part].
Charaxes ludovici Rousseau-Decelle, 1933 : 271 [Original description and photos of type examined].

The female type was originally described as a variety of *Ch. cithaeron* by Schultze. Subsequently, Rebel (1914 : 254) described what he took to be the male and gave two figures. Unfortunately, Rebel had before him two lots of males, four specimens from the Rugege Forest, N.W. of Lake Tanganyika (Grauer coll.), two specimens from Tanganyika Territory, from Manow and Iringa. These male specimens represent two distinct subspecies, the ones from Manow and Iringa are males of *brevicaudatus*, the others, males of *xiphares burgessi* van Son.

I have before me the type of *brevicaudatus* Schultze (kindly loaned by the Berlin Museum). I also have two of Grauer's specimens, and the photograph of the male figured by Rebel, who apparently did not designate a type ; the figure however is that of *burgessi*. I am informed that the Manow and Iringa specimens were in the collections of Jaennée and Neustetter respectively, but they cannot be traced. However, I have before me a male from Manow and one from Iringa (loaned by the British Museum (N.H.), *ex* Joicey Bequest and *ex* Levick Bequest) and others from intervening localities.

MALE. Fore wing length 45–47 mm. *Upperside.* Ground colour blue-black with greenish sheen towards base of fore wing ; fore wing outer margin only slightly or hardly at all concave at 4 ; discal blue spots in 2 beyond the cell end, and two below in 4–3 large, spot in 2 very small, that in 1b larger and more elongate ; long blue streak on hind margin ; post-discal spots with two prominent white subapically, remainder small and blue ; margin with small punctiform ochreous spots, larger at tornus. Hind wing discal light area blue with whitish scaling at inner and posterior borders, inner edge fairly even, outer margin indented at veins, represented at subcosta by one or two blue spots ; submarginal blue spots small or punctiform ; marginal lunules narrow and ochreous ; tails very short, somewhat variable, 2–4 mm. at 4, lower tail 2–4 mm. *Underside.* Drab greyish-brown very similar to *woodi* ; markings similar but black discal lines rather stronger and with more violet shading distad. Hind wing with discal line stronger, and intermediate ochre-olive lunules more defined ; admarginal spots clearer but marginal ochre spots and lunules narrower.

FEMALE. Fore wing length 52 mm. *Upperside.* Ground colour brown-black with purply sheen. Fore wing discal band complete ; costa whitish just above first of three elongate white marks beyond end of cell, the middle spot longer and elongate projecting beyond third spot proximal and distad, spot in 4 bluntly arrow-head shape indented on distal side and set out from about the mid-point of spot above, spot in 3 a long oval, that in 2 elongate, about half the length of one above, spot in 1b more quadrate but with outer side inclined, spot 1a on hind margin more elongate and diffuse due to purply scaling overall ; spots in middle of bar well separated ; post-discal series of spots complete, subapical ones large and white, remainder suffused with ochre ; marginal ochre spots small, and double at tornus. Fore wing bar is narrower than in *vumbui* and the post-discal series more apparent. Hind wing discal pale patch larger than in *vumbui* and whiter, with less violet dusting on sides, irregular on inner border and angled on outer side, by area in cell extending distad, the lower end merging into the greyish of the inner fold ; submarginal series of violet-blue internervular spots triangular or T-shaped, double at anal angle ; marginal golden-ochre lunules slightly greenish at anal angle well marked and only slightly divided by end of black veins ; tails longer than in *vumbui*, upper 5·5 mm, lower 5 mm. *Underside.* Generally similar to the male, but ground colour paler and lighter than in *vumbui*, but with discal white bar of above strongly represented and with the lower spots ringed with violet ; post-discal spots clearer than above, tornal black spots accentuated inwardly with olive-ochre and very well marked ; marginal ochre spots rather diffuse except those of tornus which are large and clear. Hind wing with fine black lines in upper half of basal area ; discal bar whitish and well marked in upper half and fading out on inner fold ; intermediate olive-ochre spots subdued ; submarginal violet-grey lunules clear but not strong, ending in double dark spot at anal angle ; marginal lunules well developed.

Range : Originally described from Manow in S.W. Tanganyika Territory just north of Lake Nyasa, this subspecies has now been recorded from the Poroto and

Rungwe Mts., and eastwards to Iringa, and between Morogora and Korogwe ? Turiani. Though several males have been taken, the type female remains unique. This race has recently been taken on the Nyika Plateau, Nyasaland.

Records of this subspecies from further north-west, especially from north-west of Lake Tanganyika (Rebel) are erroneous.

Charaxes xiphares burgessi van Son

(Pl. 4, fig. 28 ; Pl. 5, fig. 38 ; Pl. 6, figs. 40, 41)

Charaxes cithaeron brevicaudatus Schultze ; Rebel, 1914: 254, pl. 20, figs. 21, 22 [♂ in part].
Charaxes xiphares burgessi van Son, 1953 : 229.

MALE. Fore wing length 45–48 mm. *Upperside*. Fore wing strongly blue-black with greenish sheen at base ; blue spots well developed in discal bar, and of a bright hue, two spots beyond cell elongate, those of 3–4 larger and more quadrate, a small spot in 2 followed by elongate marks in 1a–1b, especially long in 1a and often in contact with blue spot of post-discal series in this area ; post-discal spots with two subapical rather large and white, followed by a complete series of blue spots, usually small, but well marked, though occasionally those of 3–4 may be vestigial ; marginal border with distinct golden internervular spots. Hind wing, discal patch bright blue with white scaling on inner-posterior aspect, slightly irregular on inner border and more so on outer, carried up to subcosta as two fused, or more rarely, two separate spots ; black border with well developed blue spots rather triangular in shape, double at anal angle ; marginal golden-ochre lunules well developed and separated by black veins ; tails short and robust, upper 4–5 mm., lower only slightly shorter, 3–4 mm.

Underside. Rather darker than *brevicaudatus*, mid-zone distinctly darker and crossed by paler irregular discal band ; post-discal olive-ochre lunules well marked ; the spots in sub-apex white or whitish ; tornal marks well developed with strong violet-grey surround on outer aspect ; marginal ochreous spots strong.

FEMALE. Fore wing length 50–52 mm. *Upperside*. Ground colour brown-black with a purply sheen ; fore wing discal spots, including costa above white in upper section to vein 3, lower spots increasingly suffused with yellow ochre. the two hind-margin spots fused or only just separated distally ; post-discal spots well developed, upper two large and slightly whitish inwardly, the remainder strongly orange-ochre ; marginal ochre spots large at tornus and small in other areas to apex. Hind wing discal band rather narrow, whitish inwardly with strong lavender suffusion mostly on outer side, inner border irregular, outer more so and accentuated with golden-ochre scaling on the dentate projections ; inner fold dark ashy-grey along 1c then paler to inner side ; black border with well defined lilac blue spots, double at anal angle ; margin with broad orange-ochre lunules separated by black veins ; tails, upper 7 mm., lower 5 mm. with slight outward curve. *Underside*. As in the male but paler, more greyish but the more pronounced markings are larger. Fore wing white discal band marked to as far as 1b, then represented by more greyish marks ; post-discal spots clear ; tornal black marks well developed ; marginal ochreous spots present and most marked above tornus. Hind wing ground colour and pattern as in the male, but the discal pale bar most marked and whitish in 6–7 ; ochre lunules well defined.

Range : Originally described from the Ruhiza and Mafuga forests of Kigezi in S.W. Uganda, 7,000–8,000 ft., this subspecies of *xiphares* is now known to occur in the Ruanda-Urundi country and the forests of Rugege, North West of Lake Tanganyika.

Charaxes xiphares ? ssp.

(Pl. 6, figs. 42, 45)

I have recently received from Dr. Berger, a single male specimen of *xiphares* taken by Madame Mortiers on the upper Lalule River (trib. Lualaba River, Katanga) 3,150 ft., *ex* Coll. Overlaet. No race of *xiphares* has been recorded from the Congo, other than examples of *xiphares burgessi* van Son, from the Rugege Forest, N.W. of Lake Tanganyika.

The specimen agrees somewhat with *burgessi* in that the blue discal spots of the fore wing are large, but unlike that race, the spot in 2 is large and not reduced to a dot, so that the band appears more continuous. The two subapical postdiscal spots are large and slightly scaled with ochreous distally, as in some specimens of *burgessi ;* the rest of the series are blue. The hind wing discal patch is wider than in *burgessi*, especially in 3–5, and is carried up to the costa, where the spot is slightly whitish, otherwise it is mostly blue, but with white scaling in the disc ; the submarginal series of blue spots are distinct, except at upper angle, and the marginal golden lunules are well marked in the lower two-thirds, but divided by ends of black veins ; the tails are moderately slender, longer than in *burgessi*, the upper being 5 mm., the lower 4 mm. and are mostly golden with black borders.

The underside has the ground colour paler, more brownish than in *burgessi*, with the black marks very similar, but with the olive-ochre and pale lilac shading less distinct.

This male specimen bears a strong resemblance to a subspecies of *Ch. cithaeron* which occurs in the bend of the Kafue River, Northern Rhodesia, in patches of gallery forest. The female is unknown.

Range : Known only from the Kalule area, Katanga.

Charaxes xiphares maudei Joicey & Talbot

(Pl. 5, fig. 39 ; Pl. 6, figs. 43, 44 ; Pl. 7, figs. 46, 47)

Charaxes maudei Joicey & Talbot, 1917 : 271 [♀].
Charaxes xiphares brevicaudatus Schultze ; Joicey & Talbot, 1922 : 337.

Described as a species, the female was subsequently placed to *brevicaudatus* Schultze by Joicey & Talbot, and the suggestion made that this might be allied to *xiphares*. They state that they had acquired a male from Tanganyika Territory (no exact locality mentioned) which they assumed to be that of *maudei*, and, as it appeared to agree with Rebel's figure of male *brevicaudatus*, they sank *maudei* to *brevicaudatus*. Rebel had two forms of males before him when he described what he took to be male *brevicaudatus* ; (1) four males of *burgessi* van Son from N.W. Lake Tanganyika (*Grauer*), one of which he figured, (2) a male from Manow and one from Iringa in Tanganyika which are true male *brevicaudatus* and are very similar to *burgessi* but can be distinguished easily.

I have seen the male specimen that Joicey & Talbot received which belongs not to *maudei* but to *brevicaudatus*.

Dr. van Son (1953 : 221–222), discounts Joicey & Talbot's suggestion that *maudei* and *brevicaudatus* are the same, but he admits the latter to *xiphares*.

I now have before me five males taken in association with four females which agree with the type of *maudei*. They were however captured in the upper forests of the Usambara Range, near Loshoto, by two different collectors. Although this locality is far removed from " Lindi " said to be the type locality of *maudei*, and since this locality is suspect, and the new material agrees with the type, I consider them to be *maudei*, the male of which has not been described.

MALE. Fore wing length 48–50 mm. (thus a large race). *Upperside*. Ground colour a deep blue-black, deeper than *burgessi*, with a slight greenish sheen at base of fore wing ; discal blue spots rather smaller than *burgessi* or *brevicaudatus*, with or without a spot in 2, or only slightly indicated, large spot in 1b usually present, that on hind margin at 1a a long streak ; post-discal spots in complete series, two sub-apical ones white, remainder blue, that in 1b tending to fuse with discal mark ; marginal golden-ochre spots well defined. Hind wing with large discal patch, whitish proximad and strongly blue distad, inner border merging into the greyish of the inner fold ; this patch is narrow in area 5, then there is a break followed by a detached whitish spot at sub-costa, with sometimes a very small spot distad. The black border, widest in 6–7 and tapering rapidly to the anal angle carries a series of small blue spots to area 6 ; wing margin with narrow golden-ochre lunules separated by black veins, tails, upper long and thin 9 mm., lower 6 mm., with a decided intermediate " tail "; in fact the margin of the wing is widely serrate with extreme edge black. *Underside*. Very similar to *burgessi* but of a slightly colder grey tone, with markings essentially the same, though in the hind wing the discal zigzag line is stronger ; the marginal lunules are a deeper orange and better marked.

FEMALE. Fore wing length 48–52 mm. *Upperside*. Ground colour brownish-black with purply sheen, more brownish olive at base of wings. Fore wing with well developed discal white bar which includes the costa above the three elongate marks beyond cell end, the middle one projecting beyond the other distad, median marks large, spot in 4 bluntly triangular with or without a slight indentation on distal end, spot in 3 a long ovoid or with flattened outer side, spots in 2 and 1b long ovoid set at an angle to each other, the latter merging into a bluish-lilac area contiguous with and extending into 1a at the hind-angle ; post-discal spots clear and well developed, ovoid in shape and orange-ochre in colour, two lower ones contiguous with or just slightly separated from white spots in 1b–2 ; subapical spots whitish proximally ; margin with large tornal double spot, others above less conspicuous but extending to near apex. Hind wing with large whitish discal patch with varying amount of bluish-lilac scaling on both inner and outer borders, the posterior end merging gradually into the greyish inner fold which is often dark in 1c ; the upper part of the patch extended up towards the costa by a large somewhat crescentic white spot at about mid-point ; distad to the patch is a series of elongate orange-ochre spots in 4–6, larger and more obscured in 1c–4. Black outer border widest at 7–8, tapers to anal angle ; submarginal blue spots may be large and distinct or small and rather obscured ; marginal lunules well developed, orange ochreous above tails then mixed with greenish to anal angle, the yellowish scaling being limited to base of tails, but divided by the black veins ; upper tail long, 10–13 mm., lower 7 mm., with the " intermediate tail " well developed, thus margin of wing broadly serrate. *Underside*. Ground colour and pattern generally similar to male but with the discal band of upper side fore wing well marked as far as 1b ; ochreous post-discal spots more strongly developed and the marginal ochre spots and lunules darker and more contiguous. Hind wing with the whitish discal band distad to the black zigzag line suffused with brownish, extending from costa and fading out in 1c above anal angle ; post-discal orange-ochre lunules large and more greenish above anal angle ; submarginal lilac and black lunules well developed and ending as two distinct black dots at anal angle ; marginal orange-ochre lunules well marked and contiguous, hardly divided by ends of dark veins ; extreme edge black.

Neallotype male. TANGANYIKA : Usambara, Amani, xii.1960 (*O'Brien*). British Museum (N.H.).

Range : Type said to have come from " Lindi ", but if from this area, it probably came from the Rondo Plateau, inland from Lindi : consistent trapping in the Newala area has proved negative. Several specimens, both male and female, placed to *maudei*, have now been taken in Tanganyika on the Usambara Range in the high forests above Loshoto at Magamba (*Rydon*) and at Amani (*O'Brien*).

Charaxes xiphares kulal van Someren **stat. n.**

(Pl. 7, figs. 49, 50 ; Pl. 8, figs. 52, 53)

Charaxes kulal van Someren, 1962 : 45 [♂, ♀].

Described as a species, it is now united with *Ch. xiphares* as it shows much more marked affinities to *Ch. xiphares maudei* and *x. burgessi*, than to *Ch. cithaeron*.

MALE. Fore wing length 45–50 mm. *Upperside.* Fore wing ground colour blue-black with strong blue or greeny-blue sheen at base ; discal blue spots large and conjoined at hind margin to form a large quadrate mark ; spots purply-blue, as follows : two spots beyond end of cell, subcostal one elongate followed by a smaller more rounded one, spot in 3 large and rounded and more or less in line with those above, spot in 2 directly below and slightly elongate, spot in 1b set out slightly but fused with blue of lower area and this with the elongate streak in 1a, to form a " block "; post-discal series complete, subcostal spot white and elongate, one below white and round, remaining spots violet-blue and clearly defined and that in 1b fusing with the large discal spot in same area ; marginal black border not strongly concave and with very small internervular ochre dots, hardly visible in some specimens. Hind wing basal area and border blue-black shading to greyish at inner fold ; discal area with a somewhat rounded violet-blue patch with relatively even inner border and only slightly indented on outer side, the upper end reaching to area 5 and here represented by a round spot or an elongate one and separated from the subcostal spot by a black area, the subcostal area may have two spots ; outer black border rather narrow at its lower end by an extension of the blue to just above the anal angle and the very wide marginal lunules, greenish to upper tail and then orange beyond ; submarginal spots complete from costa to hind angle, large and violet-blue in colour ; margin dentate ; tails relatively long as in *maudei* but more robust, largely orange in colour with narrow black edging ; upper tail 9–10 mm., lower 6 mm., slightly curved upward. *Underside.* Ground colour dark olive-greyish. Fore wing post-discal spots less incurved than in *maudei* or *cithaeron* ; discal zigzag line strongly black with more greyish and less ochreous shading distally ; lines in cell and bases of 2 and 3 strongly black, and greyish proximally. Hind wing marks at base more parallel, that in 7 more inward ; the zigzag discal line angled at 2 approximated more closely to the post-discal lunules, and that in 3 towards the black line in cell ; the post-discal crescentic or lunate marks above anal angle strongly black, the remainder less well marked and less accentuated in black ; marginal lunules olive-ochre not strongly indicated but the admarginal contiguous greyish lunules with black distally especially above the tails ; anal angle with a double black dot.

FEMALE. Fore wing length 53–55 mm. thus averaging much larger than males. *Upperside.* Bases of wings deep olive-brownish, darker toward discal bands and on distal portion of fore and hind wing border. Fore wing discal white band complete from costa, which is also white, the five upper marks almost in a straight line on inner border due to sub-basal spot in 3 being in line and not set out as in *maudei* and *burgessi* ; the band has three elongate spots varying in thickness beyond end of cell, followed by a bluntly triangular spot in 3, a more oval large spot in 2, a small oval spot in 1b contiguous with larger and more elongate spots in 1a and lower part of 1b, these strongly angled proximad with the spot in 2 ; these marks dusted with violet scaling proximally and with ochre distally where contiguously, there are two distinct ochre spots ; post-discal series of spots complete, the first subapical spot is a large elongate white one, followed by a more rounded one in 6, the spot in 5 is directly below, that in 4 just slightly in, that in 3 almost in line, that in 2 just slightly out, but the inward curve thus formed is not as great as in *burgessi* or even *maudei*. The margin is almost devoid of ochre spots, though there is usually an indication of two spots at the tornus in 1b, but even these may be absent, thus differing from *maudei* and *burgessi* in which these tornal spots are strongly marked. Hind wing discal patch is small and broken up, the main area is towards the end of the cell in 2–4 then there is an oval spot set inward in 4, with a more triangular spot at sub-costa, all these spots are strongly lilac ; distad to the main patch is a series of olive-ochre to orange-ochre post-discal spots large and arrow-shaped in 2–3 contiguous with the lilac patch, then two rounded spots in 4–5 touching or separate from the patch, followed by a larger rounded discrete large spot in 5 and a smaller spot above set slightly distad ; the submarginal lilac blue spots large and well marked, double at anal angle ; marginal lunules broad, orange-ochre above the upper tail, greenish-ochre or greenish-lilac at anal angle ; margin of wing dentate, extreme edge black ; tails well developed, thicker than in *maudei*, upper tail 12 mm. long, lower 9 mm. orange centred, black outwardly. *Underside*. Ground colour and pattern as in the male, but fore wing discal bar of above showing up prominently, but extending only to area 1b, and strongly outlined in black internally ; the black lines at base of wing strongly marked ; tornal black spots relatively small, but with wide ochreous border internally ; post-discal spots above in 3–5 obscured but subapical white spots more distinct. Hind wing ground colour and markings as in the male, but post-discal ochre-olive spots rather more distinct.

This female bears quite a strong resemblance to *burgessi* of S.W. Uganda, but is noticeably darker, especially on the hind wing above and below. Although the tails of *kulal*, in both sexes, are longer and more robust than in *burgessi*, there is no doubt that they must be considered conspecific.

Range : This distinctive subspecies of *xiphares* is known only from the isolated Mt. Kulal to the south-east of Lake Rudolf in the Northern Frontier Province of Kenya.

It was first discovered by Mr. T. Adamson, who took a very worn male. In the Spring of 1960 two males and a female were captured by Mr. H. D. van Someren, who in the following year succeeded in taking five males and seven females, most of them in fresh condition. The food plant is unknown.

Charaxes xiphares desmondi van Someren **stat. n.**

(Pl. 8, figs. 54–57)

Charaxes desmondi van Someren 1939 : 176 [♂].

MALE. Fore wing length 45–47 mm. *Upperside*. Ground colour deep blue-black with slightly bluer reflections basally ; blue spots very small, smaller than in *maudei* ; the discal series made up as follows : one minute streak hardly visible beyond cell in 5, followed by a rounded spot at base 4, a larger rounded spot sub-basal in 3 set well out from one above, a smaller streak-like mark in 2 just below, a faint indication of blue scaling in 1b above the long narrow streak at hind margin ; post-discal series, one comparatively large white subcostal spot followed by a smaller one more distad in 6, minute blue dots in 4–2, two larger spots set at an angle to each other in 1b ; margin with two ochre spots at tornus followed by smaller spots to subapex. Hind wing black basally shading to dark grey and brown-grey at inner fold ; discal patch relatively large, strongly blue but with white scaling on lower inner side, inner border irregular, outer border only slightly indented at veins, upper portion of patch in 6 sharply defined and separated by black from the subcostal blue spot ; black border tapering to anal angle, carrying very small submarginal blue dots ; margin with narrow orange lunules, more greenish at anal angle, slightly separated by end of black veins ; margin shows no serration but is entire except for tails ; tails almost entirely black, upper one 6 mm. long, lower 4 mm. *Underside.* Fore wing ground colour olive-brown, rather more ochreous in the cell and distal portion of the wing ; cell crossed by three black lines, the first one heavy ; two narrow lines at apex of the cell ; a small black spot at root of vein 2 ; a crescentic heavy mark at base of 2 ; three U-shaped marks in discal area, one indistinct in 1b, one in 2 and the third in 3, slightly outlined in white distally and shaded with olive-ochre ; the ocelli at tornus made up of two rather separated black spots widely bordered by golden-ochre internally and mauve distally ; post-discal lunules rather indistinct but whitish in subapex ; marginal ochreous lunules distinct at tornus but fading out toward apex. Hind wing ground colour olive-brown, more brownish on inner fold, slightly darker basally ; two fine black lines cross area 8, two at base of 7, a constricted U mark crosses the cell obliquely ; the disc of the wing crossed by faint zigzag white line ; post-discal series of golden-olive lunules, slightly darkened distad extend from anal angle to costa ; marginal lunules greenish at anal angle, more golden above upper tail, are inwardly ornamented with black and mauve admarginal interspaces ; two black spots at anal angle.

FEMALE. Fore wing length 52 mm. *Upperside.* General appearance somewhat intermediate between that of female *xiphares burgessi* and *x. kulal*, thus rather darker than *x. maudei*. Fore wing ground colour black with slight olive shading over basal half ; discal white bar relatively narrow and limited, consisting of three elongate spots beyond the cell, that in base of 4 shorter and more quadrate sub-basal spot in 3 bluntly triangular and set out and in line with the distal edge of the spot above, spot in 2 elongate-oval ; spot in 1b small and orange-ochreous, those in 1a elongate, more diffuse and ochreous, slightly dusted with dark scales ; post-discal spots with the upper subcostal spot whitish with ochre scaling distad, well marked and remainder ochreous and ill defined, those in 1b larger and more defined ; marginal spots large at termen but smaller and less well marked toward the apex. Hind wing ground colour black, shading to greyish at inner fold ; discal patch whitish with strong violet shading especially on distal border, represented at costa by a single quadrate spot with sharply defined inner border. (This discal patch is wider than in *burgessi*, but narrower than in *maudei* and with stronger violet scaling distad.) Beyond the violet shading on the distal edge there are three small strongly orange spots in 4–6 clearly defined within the black border ; submarginal spots small and bluish in 2–5, then hardly visible in 6 ; marginal border narrower than in *burgessi*, each mark less crescentic and in keeping with the narrow border seen in the male, orange above the upper tail then shaded with greenish to anal angle, the border divided by the dark ends of the veins. Edge of wing almost entire as the ends of the veins do not project, thus in keeping with the almost smooth edge seen in the males ; tails black, finer than in *burgessi* and more like *maudei* ; upper tail 7 mm., lower 5 mm. long. *Underside.* Ground colour very similar to that of the male, more light olive-brownish than *burgessi*. Fore wing with the light spots of upperside strongly reproduced ; the post-discal and marginal orange spots strongly defined. Hind wing with discal line indicated by large diffuse greyish-ochreous marks narrowly edged with white and black proximally ; post-discal and marginal orange marks clear and strong.

It is of interest to note that the restriction of the fore wing discal white bar is reminiscent of the limitation of the bar exhibited in southern races of *xiphares*, such as in *penningtoni* van Son.

Neallotype female. KENYA : Teita Range, Chawia-Bura Forests, x.1962 (*H. D. van Someren*). British Museum (N.H.).

Range : This race appears to be very scarce and restricted in distribution and is known only from the Teita Range in S.E. Kenya. The very few recorded specimens were taken in the Chawia-Bura Forest and the forest on Mt. Mbololo.

The recent capture of the neallotype female in the type locality, after a lapse of 23 years since the males were described, is a notable achievement. Five separate visits, at different times of the year, were made especially to try and secure this elusive female. In spite of intensive trapping, successful with other species, this insect appears loath to go into traps. Males have been noted flying around the tree tops, and on one occasion a female was seen at fermenting ooze on high branches of a tree infested with coleopterous larvae. Though traps were hauled up high into the tree the specimens refused to go into them, preferring the natural ooze to the fermenting bait.

Charaxes xiphares wernickei Joicey & Talbot

(Pl. 7, figs. 48 and 51)

Charaxes xiphares wernickei Joicey & Talbot, 1926 : 14.

The unique specimen on which this subspecies of *xiphares* was founded was acquired from the Wernicke Coll. by Joicey, for the Hill Museum, now in the British Museum (N.H.). The specimen bears no collector's name nor date of capture ; it was said to have come from South Cameroon. Considerable collecting has been done in the Cameroons and nearby French Congo during recent years and no specimen of *xiphares* has turned up.

It is known that H. Wernicke himself did not visit Africa and that he was a dealer in entomological material and his personal interest lay in Indo-Malayan specimens.

The brief comparative description of the female type does not mention any character which would readily distinguish it from a South African specimen of *xiphares*, possibly *draconis* or *bavenda* ; moreover the character mentioned relative to the position of the post-discal line of the hind wing below, would seem of doubtful value since the hind portions of both hind wings have been " repaired "!

In my view this specimen is suspect.

Charaxes nandina Rothschild & Jordan

(Pl. 9, figs. 58, 59, 61, 62)

Charaxes nandina Rothschild & Jordan, 1901 : 403 [♂].
Charaxes nandina Rothschild & Jordan ; Rothschild, 1905 : 78 [♀].
Charaxes xiphares nandina Rothschild & Jordan ; Poulton, 1926 : 545, 572.

First described as a species, *nandina* was later associated with *xiphares* by the late Prof. Poulton in 1926. When Dr. van Son (1953) reviewed the races of *Ch. xiphares* he adopted Poulton's allocation but with some reluctance, for although the female *nandina* bears a strong resemblance to females of southern subspecies of *xiphares*, there are strong differences in pattern, not only in this sex, but in the male also. Moreover, if indeed *nandina* is only a subspecies of *xiphares*, it is most remarkable that, whereas races of *xiphares* to the north have gradually evolved away from the nominate pattern, and through gradual transitions to the quite different looking pattern of *brevicaudatus*, *burgessi*, *maudei*, and *kulal*, *nandina* should suddenly revert to a nominate-like southern pattern and coloration in the highlands of Kenya!

The possibility of mimetic resemblance does not, in my opinion, arise, for in the Nairobi area where *nandina* is common, possible "models" are rare. The differences in the male genitalia of *nandina*, *xiphares* and *cithaeron* are not great, but *nandina* shows the greatest departure from the others, which are extremely similar.

My considered opinion is that *nandina* is a distinct species.

Ch. nandina has been seen laying on *Hippocratea obtusifolia* (Hippocrateaceae), also on *Crabia*, but its chief foodplant in the Ngong area is *Drypetes gerrardii* Hutch. (Euphorbiaceae) (*D. battiscombei*, syn.), on which numerous specimens have been reared. The foodplant of *xiphares* is *Cryptocarya woodi* Engl. (Laurineae) in the Natal area. I have compared the larvae of *nandina* at all stages, with those of *xiphares* as depicted by Gowan Clark and they are markedly different.

MALE. Fore wing length 45–50 mm., majority 47 mm. *Upperside.* Ground colour deep blue-black, with brighter blue sheen at base of fore wing especially in the cell ; fore wing discal spots white with sparse bluish scaling around them ; two spots beyond cell, the upper one a narrow streak, lower one larger and ovoid ; spot at sub-base 3 more rounded and set well out, that in 2 more elongate and set slightly obliquely ; upper proximal spot on v.2 small and blue or absent, but distal spot clear and oval ; lower spot in 1b elongate and well marked ; a long blue streak on hind margin and separated from the spot above ; post-discal series of spots clear, those from costa to 2 white in colour, the lower two often with slight orange scaling ; marginal orange-ochre spots, double in 1b at tornus small but clear ; outer margin of wing only slightly concave at 3–4. Hind wing ground colour blue-black, more black on distal part of inner fold shading to greyish on inner margin ; discal blue patch rather narrow, starting at 2 it crosses the apex of the cell to 4, and represented on the subcosta by a large rounded or oval white spot with bluish scaling on lower side ; distal and separate from the discal patch, is a series of post-discal, well marked blue spots starting in 2 and reaching the subcosta where the spot is often white, the spot in 6 is set in and may fuse with the discal patch here. (This post-discal series of spots is not found in any subspecies of *xiphares*.) Complete row of submarginal blue spots, double at anal angle, may be small and rounded or larger and more triangular, but well marked ; marginal orange-ochre lunules extend from anal angle to upper angle, or stop short in area below ; margin of wing bluntly dentate ; tails long and slender, upper one 8 mm., lower 5 mm., black centred. *Underside.* Ground colour fore wing olive-grey, more greyish toward hind portion, more golden tinged in cell area and distad to the discal line ; cell with a straight line in sub-base, followed by a curved transverse line at mid and third distance, a double line at and just beyond cell, all lines black edged with white ; a small black dot at base 1b with a triangular mark beyond ; a straight line at base of 2, black and white internally ; discal line wavy black with white outer border ; post-discal row of spots as above, upper spots whitish with orange scaling distally usually rounded, those in 1b–2 crescentic and orange-tawny, inwardly black adjacent to tornal black spots which are relatively small, that in 1b almost divided, outwardly edged with greyish-lilac ; marginal lunules clear at tornus but less marked towards subapex. Hind wing ground colour as fore wing ; thin black wavy lines through cell and sub-base of 6 ; rather thin discal wavy line white and black, extends from costa to above anal angle, with an outward kink at 3 ; post-discal olive-ochre lunules shaded lilac and black at anal angle reach the costa ; marginal olive-ochre lunules shaded lilac internally are black spotted above the tails, a double black spot at anal angle.

FEMALE. Fore wing length 51–57 mm. *Upperside.* Ground colour black when fresh but tending to brownish toward base of fore wing. Fore wing discal bar white or with just a

slight creamy tinge and with spots as follows : a small streak may or may not be present at subcosta, followed by a long oval spot then by a blunt triangular mark, base towards end of cell, spot in 3 set well out, oval in form and below this a long oval or somewhat triangular long mark in 2 ; there may be a minute dot below the distal end of this spot in 1b ; post-discal spots are well defined, large in the subapex, slightly smaller to spot in 3 which is set in a little, all usually white, but those in 1b and 2 are smaller and ochre in colour ; there is usually a long rather diffuse ochre mark along the hind margin. Hind wing, base blackish shading to greyish-brown, then paler along inner fold ; border black ; discal patch large and ochre in colour reaching to base of 4 proximally, inner border not sharply defined, outer border more clear-cut especially toward upper half where the patch is represented by a large quadrate subcostal mark usually whitish or slightly ochre in colour ; distal to this patch there is a complete row of large ochre spots starting at subcosta in 7 to just above the anal angle in 2 ; these spots may be free, contiguous to or merged into the discal patch at or below 5 and these spots correspond to the post-discal series of the male and in a majority of females, the spots are free especially in the upper half ; submarginal spots small, blue or violet-blue in colour ; marginal lunules well developed, ochre above upper tail, slightly greenish at anal angle ; tails long and slender, upper 10–11 mm., lower 6–7 mm., black. *Underside.* Ground colour generally similar to that of the male ; rather less " satiny " with golden reflections in the distal half of the fore wing and with the discal bar strongly indicated. Fore wing basal lines as in the male, discal white bar outlined in black proximally ; post-discal and tornal marks strong ; marginal golden-ochre lunules strong at tornus but fading towards subapex. Hind wing basal marks in 7 broadly white internally ; discal band white proximally, shaded with brownish scales distally and sharply delineated by black internally ; post-discal marks from upper tail to costa crescentic, white, proximally lined in black ; hind angle marks greeny-ochre lightly black proximally and broadly black distally ; submarginal lunules lilac with black distal outline, double spot at anal angle ; marginal lunules ochre-olive above tails, more greenish to anal angle.

Range : The chief area inhabited by this species is the semi-dry forests of the Nairobi-Ngong districts, Karura, Langata, Ndeya, upper Kikuyu. It occurs also in the higher forests of Uplands, Katamayu, Escarpment, the southern Aberdares and on the south-eastern slopes of Mt. Kenya. Though recorded from Nandi-Sotik, I have no authentic records from west of the Rift Valley. A specimen in the British Museum (N.H.) said to have come from " Old Moshi " south Mt. Kilimanjaro is certainly incorrectly labelled.

SYSTEMATIC LIST

Charaxes xiphares (Cramer)

Charaxes xiphares xiphares (Cramer), 1781. Type locality : Eastern Cape Province, van Stadens to Knysna.

f. *occidentalis* van Son, 1953. Type locality : Groot-vaderbosch, Swellendam. Range : Swellendam to van Stadens, Port Elizabeth.

thyestes (Stoll), 1790.

Synonyms : *reducta* Rothschild, 1929. (*elatias* Jordan, 1936). Type locality : Somerset East. Range : Eastern Cape Province including Pondoland, Zourberg to Port St. Johns.

penningtoni van Son, 1953. Type locality : Champagne Castle, Natal.

♀ f. *luminosa* van Son, 1953. Range : Natal, in higher forests National Park, Champagne Castle, Balgown ; also Eshowe and Rietvlei.

draconis Jordan, 1936. Type locality : Mariepskop, Lydenburg District.

♀ f. *candida* van Son, 1953. Range : Forests of Drakensberg Range from south of Oliphant's River to Barberton.

kenwayi Poulton, 1929. Type locality : Haenetsberg, Pietersburg, Transvaal.

♀ f. *lutea* van Son, 1953. Range : Forests of Volkberg Range, north of Oliphant's River.

bavenda van Son, 1935. Type locality : Zoutpansberg. Entabeni, N. Transvaal.

♀ f. *ochreomacula* van Son, 1935.

♀ f. *cyanescens* van Son, 1935. Range : Forests of Zoutpansberg Range. N. Transvaal.

vumbui van Son, 1936. Type locality : Elephant Forest, Vumba Mts., Umtali district, S. Rhodesia. Range : Forests on eastern border of S. Rhodesia, Umtali to Chirinda Forest.

woodi ssp. n. Type locality : Cholo, S. Nyasaland. Range : Southern area of Nyasaland ; Cholo and Limbe.

brevicaudatus (Schultze), 1913. Type locality : Manow, north of Lake Nyasa S.W. Tanganyika Territory. Range : The southern highlands forest on Mts. Poroto and Rungwe ; Mbeya, Manow, Songea, Iringa and ? Morogoro. Recently taken on Nyika Plateau, Nyasaland.

burgessi van Son, 1953. Type locality : Ruhiza and Mafuga forests, Kigezi, S.W. Uganda.

maudei Joicey & Talbot, 1918. Type locality : "Lindi"; Tanganyika Territory. Range : ? Lindi area, possibly Rondo Plateau, but definitely on higher forests of Usambara Mts.

kulal van Someren, 1962. Type locality : Mt. Kulal, east side Lake Rudolf, northern frontier Kenya. Range : Known only from Mt. Kulal.

desmondi van Someren, 1939. Type locality : Teita Hills, Kenya. Range : The forests of the Teita Range, Chawia, Wandanyi. Mbololo.

wernickei Joicey & Talbot, 1927. Type locality : Southern Cameroons.

This specimen and locality are suspect.

Charaxes nandina Rothschild & Jordan

Charaxes nandina Rothschild & Jordan, 1901. Type locality : Escarpment Uplands, Kikuyu. Range : The forests of Nairobi area to Upper Kikuyu, Katamayo, southern Aberdares. Meru, Mt. Kenya, east of Rift Valley. Records from Nandi-Sotik doubtful.

2. *CHARAXES SMARAGDALIS* BUTLER, AND ITS SUBSPECIES

The first critical examination of *Charaxes smaragdalis* Butler appears to be that by Rothschild & Jordan (1900).* At that time, only one subspecies was recognized, *butleri* Rothschild. The authors pointed out that the name *princeps*, applied by Butler to specimens from Cameroons, was a renaming of the nominate race and that in reality, the race without a name was that of Sierra Leone and the Gold Coast, which Rothschild named *butleri*. They included within the range of the nominate race, a male specimen from Rau, Nandi, East Africa, but noted certain differences which appeared to them to suggest that *smaragdalis* was related to *Ch. cithaeron* Felder, and might even be " geographical representatives of one species ". It is true that the two do not overlap in distribution, but for very sound reasons they are now considered to be two distinct species.

Aurivillius, in " Seitz " (1911), supported Rothschild & Jordan in recognizing two subspecies of *smaragdalis*. Joicey & Talbot (1917) recognized a third race from the Kericho-Sotik area of Kenya which they named *orientalis*, unfortunately overlooking the fact that this name had already been used by Staudinger (1896) for the eastern subspecies of *Ch. castor* (Cramer) ; but Staudinger also appeared unaware that Butler (1895) had already named the eastern *castor* as *flavifasciatus*.

However, the name *orientalis* Joicey & Talbot remained in use until recently (cf. Ghesquiére (1933) and Carpenter & Jackson (1950 : 97–98), when the latter described what they took to be the female of *orientalis*). But Felix Bryk (1939) had already indicated that *orientalis* could not be employed for the eastern race of *smaragdalis* and published the substitute name *homonymus*, but apparently without giving full reasons for the change, except that *orientalis* was preoccupied.

Carpenter & Jackson (1950) described the female " form " *caerulea* from Kalinzu, W. Uganda, comparing it with *orientalis* Joicey & Talbot, but Jackson (1951 : 99–100) raised *caerulea* to subspecific rank, and briefly referred to the associated male. He too, overlooked the name *homonymus*, and used the name *orientalis* Joicey & Talbot for the eastern race of *smaragdalis*.

During the last twenty years, and especially in the past decade, extensive material of *smaragdalis* has been accumulated and the species is now known to range over a much more extended area than was previously thought. A study of this material indicated the desirability of revising the species on a pan-African basis, and for this purpose I have brought together a very considerable material representative of the present known range of *Ch. smaragdalis*.

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*In this paper, the descriptions of new species and subspecies are by Rothschild alone.

Unfortunately, it has been impossible to work out the regional distribution of the species in some areas, such as Gabun, and Cameroons owing to paucity of material and one has had to rely on a small " sampling ". The species has a very wide range extending from Sierra Leone in the west to Kenya in the east, with a marked concentration along the equatorial belt especially of the Congo and eastern Africa, but in the latter area which has been subjected in the past to much volcanic and tectonic disturbance, with consequent change in climate and vegetation, especially along the two main Rifts, the species has not only survived but has evolved into several geographical races.

It is these subspecies which I propose to consider in detail and to correlate them with long-recognised races.

In this paper, the terms " subspecies " and " geographical race " are treated as synonymous ; a " form " as a genetical strain ; a variety as a variation from the general pattern, occurring occasionally ; and an aberration, usually individual, turning up rarely, affecting shape, pattern or colour.

When considering the distribution of *smaragdalis* within the Congo on a broad basis, one must take into consideration the general topography of the country and its vegetational characters. One of the chief physical features throughout the northern half of its distribution is the great Congo River, and the Kasai River and its tributaries in the southern section ; but these by themselves, except in the mid and lower reaches of the former are not important as ecological barriers. Of far greater importance is the vegetational coverage, combined with altitude. The great block of the Lowland Rain forest, roughly 4 degrees north and south of the Equator has a fairly uniform type of *smaragdalis*, agreeing in the main with the nominotypical subspecies, but in the east where the forest borders on the Albertine Rift there is a line of high montane forest extending from N.W. of Lake Tanganyika to the west of Lake Edward, then broken in the Semliki Valley area but appearing again northwest of Lake Albert. In this break in the chain of montane forests, the lowland rain forest extends eastward to the Semliki and to the Bwamba Valley, west of Ruwenzori. In the eastern protrusion of the forest, from Beni to Irumu, *smaragdalis* tends to be large and with slightly less blue on the upper surface than nominotypical specimens, and to the northward, in the Kibali-Ituri area, especially toward the west of Lake Albert, specimens exhibit even greater reduction of the amount of blue in the hind wing, with consequent broadening of the black border. There is thus a tendency toward the race *caerulea* of the eastern side of the Rift. Similarly, we find that *smaragdalis* of the western Kivu and at the north end of Lake Tanganyika is definitely allied to the race inhabiting the high forests of western Uganda, Kalinzu, and Kayonza in Kigezi, i.e. the race *caerulea* in which the females are more male-like and lack the decided white-blue fore wing bar, the discal spots being blue. Another derivative of this is found in the high forests of Toro.

In the southern Congo, outside the area of the Lowland Rain Forest, viz. Katanga, Kasai and Sankuru, where the forest areas are mostly of the gallery type along rivers, in otherwise open grass savanna and wooded savanna, and scattered forest patches, *smaragdalis* exhibits a degree of instability, some tending toward the north-eastern races, the majority toward the nominotypical, to which, for the time being they must be placed. In the Leopoldville area divergence is again more noticeable. Some males I have examined have been determined as "*butleri*" on account of the reduced area of blue in the hind-wing, and Ghesquière compared his *leopoldi* with "*orientalis*" for the same reason. The females in this area are variable : one from Leopoldville has the fore wing discal bar composed of separate, relatively small, white-centred blue spots in the upper half and uniform blue in the hind portion ; two others are nearer the nominotypical subspecies, but with slightly narrower bars.

It is quite possible that when a more detailed survey of the terrain of the southern Congo has been carried out, it will be found that the area can be divided up into definite ecological zones each with a distinctive environment and that the variations which at the present appear mixed up, are in reality each limited to a specific area (cf. Map 2).

Bearing in mind the fact that *Ch. smaragdalis* has a very wide west to east distribution, covering areas without strong ecological barriers, especially in the Congo, thus lessening the reproductive isolation of some of the subspecies, there is as I have shown, some instability of racial characteristics as evidenced by the few, but a large majority are stable. In the eastern area of its distribution, i.e. east of the Albertine Rift, there is this isolation and the races are well defined. In contrast to the continuity and consequent uniformity of environment of the northern Congo, we find that to the east of the western Rift suitable forest habitats are scattered and well separated by unsuitable grass and savanna country as follows (cf. Map 3) :—

1. A limited area of forested hills in the Metu-Moyo district of West Madi, West Nile district of Uganda, and forested mountains in southern Sudan.
2. The isolated forests of Budongo and Bugoma east of Lake Albert, and the forests of Toro.
3. The high forests of south west Ankole area, Kalinzu etc., which by gallery forests merge into 4.
4. The high forests of Kigezi, Ruhiza, and Mafuga, which in turn link up with the great impenetrable forests of Kayonza and the Ishasha Gorge and by stages to the forested mountains of the Mufumbiro Range, the region of volcanoes in Ruanda and so to west Kivu and the north end of Lake Tanganyika, on the west.
5. The considerable area of lowland rain forest on the west side of Lake Victoria :— the Katera and Tero forests north of the Kagera River in Uganda, the forests of the Kagera river system in the north Bukoba district of Tanganyika, south to Biharamulo and Geita.
6. The area of primary forest to the north and west of Mt. Elgon, in the Mbale district of Uganda. The mountain on this side belongs to the archaic basement complex ; and the forests, or what remains of them, are relicts of the distant past when primary forest probably extended right across Uganda. The main forests are the Bufumbo and Bumasifa to the north of Mt. Kokanjero. The south and eastern slopes of Mt. Elgon are largely volcanic, and the forests

secondary. South of Mt. Elgon the country is mainly savanna with small patches of riverine heavier growth or open grass-land as on the Uasin Gishu Plateau.

7. The Nandi forest, and further west the Kapwaren forest, composed of three main areas, the Kaimosi forest, the Kakamega forest and the Kabras forest, at roughly 5,000 ft. in North Nyanza, flanked to the south by the Maragoli Escarpment overlooking the low central Kavirondo plains at 3,700 ft., which are an efficient barrier.
8. The high Mau country with heavy forest in the valleys at 8,000–9,000 ft., with the Elgeyo Escarpment to the north-east but to the south-east of the Mau across the Lumbwa Valley there are extensive forests to the Kericho-Sotik area at 6,000 ft, with areas of broken forest toward the Mara River, the Chepalungu Forest and toward the Kisii Highlands. There are no large forests east of this though several gallery forests exist in the Suna area.

It will be noted from this broad survey of the forested areas inhabited by *smaragdalis*, that the species does not extend east of the Rift Valley in Kenya, and the majority of the eastern subspecies lie between the Albertine Rift and the high ground west of the eastern Rift and around Lake Victoria. It is of interest to note that whereas in the majority of races there is a uniformity of pattern in the females conforming to that of the nominotypical, i.e. a conspicuous white discal bar in the fore wing, it is in the east and the Kivu area of the Albertine Rift that the females retain a more male-like pattern. Whether this is a relic of an ancestral pattern or a recent trend, is a matter of considerable interest.

Strangely enough, there are no records of *smaragdalis* to the north and south-east of Lake Victoria, though in the former there are apparently suitable forests such as those around Entebbe, Mawakota and the extensive Mabira Forest. There are now no large forests in Busoga and the area of the Nile with its entry into the Sud-covered Lake Kioga, is devoid of suitable habitats for *smaragdalis*.

DESCRIPTIONS AND NOTES

Charaxes smaragdalis smaragdalis Butler

(Pl. 9, figs. 60, 63 ; Pl. 10, figs. 64–70 ; Pl. 11, figs. 71–76)

Charaxes smaragdalis Butler, 1865 : 630 [♂].
Charaxes smaragdalis Butler, 1869 : 5 [♀].
Charaxes princeps Butler, 1896 : 376.

As pointed out by Rothschild & Jordan (1900), and now generally accepted, the nominate race is that occupying the Nigerias to the equatorial zone of the Congo and Gabun.

MALE. Fore wing length 45–47 mm., mostly 46 mm. *Upperside.* Ground colour blue-black with slight green sheen at base fore wing (this may be slightly purply-brown in old specimens) ; fore wing discal band strong, blue with slight greenish tinge when fresh, slightly purply-violet tinged when oxidised ; spots comparatively large, two, with an occasional streak below costa, at end of cell ; spot in base of 4 blunt arrow-shape, set a little distad to outer end of spot above ; spot below quadrate, toward base with a streak extension along vein 3, spot in 2 long quadrate, that in 1b similar, while the streak in hind margin extends distad to the post-discal area, the bases of the last three spots almost in a line and at an angle to spots above ; post-discal spots well developed, two subapical spots white, upper one larger and elongate-quadrate, spots in 5 round or angular, spot in 4 set in a little, that in 3 and 2 also set in so that these three are at an angle to subapical spots ; spots toward tornus increasingly arrow-shaped and contiguous to or fused with long spots in 1a–1b ; margin with double spot at tornus, small but visible, to just below apex ; wing margin very slightly concave at 3. Hind wing basal area black, shading to greyish at inner fold ; discal patch light greeny-blue (slightly purply in old specimens) large, represented by two separate spots below costa, then with slightly curved outer border reaching to hind margin at upper tail, so that the black outer border is mainly in the upper half, widest at 6 and carrying a series of blue, white-centred submarginal spots, those toward the hind angle with black surround ; marginal lunules blue with whitish ends, fused with the discal patch at anal angle and discrete above upper tail ; margin of wing bluntly serrate ; fringe white between veins ; tails short : upper 5 mm., lower 2–3 mm. *Underside.* Ground colour dark olive-grey-brown with olive-ochre interspaces at base of fore wing, ochre shading distal to black discal marks and on outer border ; black marks strong, three cross bars in cell, a double bar at end of cell, strong sub-basal marks upper part 1b and 2 ; crescentic black marks (lines) broadly bordered with olive-ochre in the discal line ; post-discal row of spots, whitish at subapex become larger and crescentic, ending in a large blue-black tornal " eye-spot " slightly margined with lilac outwardly, bifid on outer aspect ; marginal olive-ochre lunules clear at hind angle but fading out toward apex. Hind wing ground colour olive-grey-brown ; black lines thin, those at base and disc of wing enclosing or bordered by olive-ochre, post-discal crescentic marks olive-ochre edged with whitish internally, blackish externally run from subcosta to anal angle ; submarginal white triangular spots with lilac and black distally extend from subcosta to anal angle where the spot is double ; marginal lunules olive-ochre, more greenish at anal angle ; extreme edge black with white internervular fringing line. The whole underside has a speckled appearance, with the white submarginal spots in hind wing showing up clearly.

FEMALE. Fore wing length 48–52 mm. *Upperside.* Ground colour black distally and with bluish-green sheen on basal black ; fore wing discal bar broadly white ; costa white where bar begins, subcostal mark narrow, next elongate and extending well beyond the third more quadrate mark at end of cell ; subbasal spot in 4 bluntly triangular, set out toward end of the spot above, outer side straight and forming a line with the larger spot in 2, these two spots edged with light blue proximad ; large elongate marks in 1a–1b pale blue and reaching almost to the tornal angle, the latter with two long, oval whitish areas in centre ; post-discal spots : two upper ones white and distinct, the first one elongate-concave, the second more rounded or quadrate, lower spots blue and not so distinct set at an angle to upper ones, the one in 2 set out at an angle, those of 1b fused with the discal mark ; marginal spots, double at tornus, blue or whitish ; extreme edge of wing white internervularly. Hind wing basal area black with a slightly greenish tinge merging into the greyish-brown on inner fold ; discal pale blue patch large, extending to the anal angle and area above upper tail, represented at costa by a more greyish-blue mark or by two marks ; marginal black border thus limited to an area in region of upper angle ; submarginal spots bluish with white centres in this border then as smaller bluish-white spots with black surround in the extended discal blue in the anal angle ; marginal bluish-white lunules strongly marked above upper tail ; extreme edge white in bay between veins ; margin of wing bluntly serrate. *Underside.* Much as in the male but the discal white bar corresponding to that of upperside is extended to upper part of 1b, while the black tornal spots are larger and the black centres of the post-discal spots of upperside are here large and elongate.

Range : The nominate subspecies has a range from Nigeria, Cameroons, Gabun to French Congo and the greater part of the " Lowland Rain Forest " of the Congo reaching the eastern border, which is bounded by the high montane forest west of the Albertine Rift. There is however an extension of the " Lowland Rain Forest " to the north of the montane ridge in an eastward direction, and this reaches the Semliki River and crosses into the Bwamba region west of Ruwenzori. This eastern projection runs roughly from Beni to Irumu and north to Mahagi. In this area *smaragdalis* exhibits a definite tendency to be large, the males have a fore wing length of 48–52 mm. averaging 50 mm. with the blue of the fore wing slightly less extended toward the tornus and a slight restriction of the discal patch in the hind wing above the upper and lower tails. The females show a similar tendency of restricted blue and white areas above.

As there appears to be some variation in these characters and no ecological barriers, it seems best to consider the Beni-Irumu insects as merely a generally larger form, ***beni*** **forma n.,** Pl. 9, fig. 63.

Charaxes smaragdalis butleri Rothschild

(Pl. 11, figs. 77, 78)

Charaxes smaragdalis butleri Rothschild in Rothschild & Jordan, 1900 : 385 [♂, ♀].

MALE. Fore wing length 43–48 mm. *Upperside.* Ground colour as in the nominate race ; blue spots of discal bar and those of the post-discal series smaller and not extended so distad toward the tornus but carried more proximad along the hind margin ; there is thus a wider black border to the fore wing, but a reduction in the basal black and a greater angling of the upper blue spots and a more solid blue area in the posterior section of the band ; marginal spots more distinct. Hind wing differs from the nominate subspecies in the greatly reduced blue patch distally, with a consequent greater width of the black border especially in the area above the tails, this then results in all the blue spots of the submargin being free, even to the double spot at the anal angle. The blue areas are, on the whole, more greenish than in the nominate race. The tails have a distinct white line. *Underside.* Very similar to the nominate subspecies, but with the fore wing triangular discocellular marks wider and paler.

FEMALE. Fore wing length 47–50 mm. *Upperside.* Pattern generally similar to the nominate *smaragdalis* but fore wing white band broader, largely due to the third spot beyond cell being longer while the white areas in marks in 1b are longer ; the pale blue in this area not carried toward the tornus ; post-discal spots absent except the two white ones in subapex ; marginal spots, even the tornal ones very faint or missing. Hind wing pale blue discal patch more restricted, leaving a considerable black border to anal angle ; the blue area represented at costa by two separate spots ; submarginal spots and marginal triangles clear and defined from anal angle to subcosta ; those in the latter with rather more white ; tails about same length as in nominate race, and with a white central streak. *Underside.* Ground colour and pattern similar to the male but with the broad fore wing white bar clearly marked and extending to 1b ; the post-discal marks in the form of ocelli, very black centred and rounded from tornus up to 3, then more ovoid and less black up to the costa ; whitish marginal triangles in hind wing very marked above upper tail.

Range : Sierra Leone to Ghana.

Charaxes smaragdalis leopoldi Ghesquière

(Pl. 12, figs. 79–84)

Charaxes smaragdalis leopoldi Ghesquière, 1933 : 4 [♂].

This seems an appropriate point at which to consider the rather mixed population of the southern portion of the Congo, outside the " Lowland Rain Forest belt ", inhabiting the broken areas of forest and gallery forests of the savanna country to which I have already made reference.

From amongst this aggregate, Monsieur M. J. Ghesquière has described two " regional forms " which are to be considered as subspecies (see Ghesquière, 1933 : 5).

The subspecies which concerns us at this juncture is *leopoldi*. The type comes from Komi (Ter. Lodja), a paratype from " La Kondue, bords du Sankuru ", and a male from Leopoldville, Sohal. The type was figured, by Ghesquière and the figure is here reproduced by permission (Pl. 12, fig. 79). The characters cited for this race are not very satisfactory ; the strong green reflections toward the base of the fore wing and the broken blue patch in the hind border in 1a–1b are characters found in variations of *smaragdalis* from throughout the savanna and gallery forests of the southern Congo, as is also the variation of the blue of the hind wing extending towards the anal angle.

I have not seen the specimen from Sankuru, but the example from Sohal agrees with other specimens from the Leopoldville area and north-western Angola, in having a distinct black border to the hind wing, thus unlike nominate *smaragdalis*. (Cf. Pl. 10.) Moreover, the females from Leopoldville are unlike nominate *smaragdalis* in that the fore wing white bar is narrower and is often represented by well separated spots, reminiscent of the subspecies *caerulea*, to the east, at Manyema etc.

Although the characters of this race are unsatisfactory, and the exact range undefined, one must admit that the insects are not nominate *smaragdalis*, and since the name *leopoldi* is available it can be applied to the insects from Northern Angola and the Leopoldville district eastward to Sankuru and Kasai.

Material from Katanga is totally inadequate on which to form any conclusions.

Charaxes smaragdalis caerulea Jackson

(Pl. 12, figs. 85–87 ; Pl. 13, figs. 88–93 ; Pl. 14, figs. 94–98)

Charaxes smaragdalis ♀ f. *caerulea* Carpenter & Jackson, 1950 : 97 [♀].
Charaxes smaragdalis caerulea Jackson, 1951 : 99.

Described originally as a " form " this aggregate was rightly raised to sub-specific status by Jackson (1951 : 99) when he described the associated male.

MALE. Fore wing length 46–51 mm., majority 50 mm., thus a large race. *Upperside*. Ground colour deep blue-black with a strong greenish or bluish-green sheen over the base of the fore-wing ; discal blue spots smaller than in the nominate subspecies from Nigeria and French Congo and more like the large form from Beni ; two blue spots beyond cell, first spot narrow and elongate, second spot rounded or quadrate ; sub-basal spot in 3 set well out, rounded or triangular, spot below in 2 more elongate and at an angle to one above, spot in 1b often separated or fused with spot above, always well away from the hind angle. Hind wing discal blue patch is rather restricted in the majority of specimens, being almost straight on its inner border and though curved on the outer there is a defined black border right up to the anal angle, the patch represented at the subcosta by one or two rounded well separated spots ; the black border carries a complete series of bluish-white spots, smaller and double at anal angle ; marginal lunules blue, slightly whitish toward upper angle ; margin bluntly serrate ; tails short, upper 4–5 mm., lower 3 mm. *Underside*. Much as in the nominate race, slightly less dark, but markings similar except that the mid-discal black marks are heavier, and in the hind wing the black edgings to the sub-marginal lunules are stronger.

The original description of the female is brief in the extreme, but it does give the salient features.

FEMALE. Characterized by absence of white from the discal row of spots on the fore wing. Fore wing, two narrow, bluish-white, subapical spots in 6–7 are all that exist of the outer series which in the male extends from 2 forwards (in some of the paratypes the series is complete though faintly shown). None of the blue spots in areas 1a, 1b, 2, 3, 5 and the end of the cell, show any white and they are of the same tint as the discal band of the hind wing which shows no white suffusion in the costal area as does the typical female *smaragdalis* Butler. Hind wing like that of the male *S. orientalis* Joicey & Talbot. On the under surface both wings resemble those of the male *S. orientalis*.

Up to the time of publication of this description this race was not known to occur beyond the Kalinzu area, Ankole. It is now recorded from Kayonza, Kigezi and extends into the east Congo in the Kivu-Manyema districts. The Kayonza insects are large ; those of Kivu smaller and more like the Kalinzu examples. They are here treated as belonging to one race. The Kayonza females exhibit the following variations :—

Fore wing length 50–55 mm., mostly 53 mm. *Upperside.* Ground colour black in distal half, more brownish at base with a greenish sheen. The typical female has the discal spots large and blue, but the overall width of the band is narrower than that in the white-banded races. The marks in 1a and 1b are usually fused, the post-discal spots conspicuous and white in the subapex, indistinct and bluish up to 1b where a double spot, usually bluish may have some ochre scaling distally. In some examples from Kayonza, the spots in 2–5 may be orange-ochre, but ill defined. From this area too, come females which have white or bluish-white fore wing discal spots from 2 to spots at end of cell. A scarce variation occurs in which the four upper discal marks are narrow streaks. The margin of the wing usually has a double ochre mark in 1b and hardly any visible marks up to the apex. Hind wing blue discal patch has an almost straight inner border, and more curved outer border, and is represented at subcosta by one or two discrete spots. Black border entire and not encroached upon by blue even at the anal angle, carries a complete row of submarginal angular spots, more bluish at hind angle then more whitish up to upper angle ; marginal lunules well developed, bluish or greenish to upper tail then ochreous beyond and separated by black veins ; margin of wing very slightly bluntly serrate ; upper tail 7 mm., lower 4 mm. *Underside.* As in the male, but with the discal bar of upperside represented by a strong zigzag black line outwardly shaded with greyish-ochre (or white in white spotted variety) ; tornal spots distinct but not heavy, spot in 1b often divided. Hind wing as in the male but markings enlarged.

The variations in the Kayonza females are not worthy of form or even varietal names as there is intergrading.

Range : Ankole district, Kalinzu Forest, extending to the Kayonza forests (Impenetrable and Ishasha) in Kigezi district, S.W. Uganda, then to the Kivu and Manyema districts of East Congo.

Charaxes smaragdalis toro ssp. n.

(Pl. 14, figs. 99–101 ; Pl. 15, figs. 102–107)

Specimens of *smaragdalis* from the Toro district, Utwara, Mpanga and Kibale Forests, though allied to the race *caerulea*, differ sufficiently to warrant recognition as a distinct subspecies. There is a wide ecological barrier between the two in the form of grassland and savanna which is unsuited to the species.

MALE. Fore wing length 45–48 mm. (rarely over). *Upperside*. Ground colour purply-black, with purply-brown tinge at base ; fore wing discal spots smaller and darker, with a decided violet tinge ; the spots in 1b and 2 completely separated, the streak on the hind margin often very small and not connected with spot above and may be just a single spot under the post-discal series, very rarely a long streak ; post-discal series well marked : two subapical spots large and white, spot below often white, spot in 1b not connected to discal mark ; marginal spots very well developed and white or slightly ochre tinged. Hind wing discal patch narrow almost as in *homonymus* with resultant wider black border with no extension of the blue into the anal angle ; submarginal spots in black border comparatively large, blue with white centres ; admarginal lunules, blue at tails but whitish beyond ; blue areas have a distinct violet tinge, not in any way due to age, tails as in *caerulea*. The whole upperside of this race has a more spotted appearance than any others. *Underside*. Ground colour more brownish than *caerulea* and ochreous marks and shading more in evidence.

FEMALE. There is some variation in size, but they are generally smaller than *caerulea* with an average wing length 50 mm. Conforms to the *caerulea* pattern but the discal and post-discal spots are separated in areas 1b–2 and the streak at hind margin separated from spots above as in the males. Hind wing patch more restricted than in *caerulea* ; the submarginal spots in black border usually distinct.

Holotype male. UGANDA : Toro district, Kibale Forest, v–vi.1956 (*van Someren*). British Museum (N.H.).

Allotype female. Same data; British Museum (N.H.).

Range : This subspecies, in the typical form, is limited to the forests of the Toro area, east of the Ruwenzori Range, and has been taken in the Utwara, Mpanga and Kibale forests. An allied form occurs in the Bugoma forest east of Lake Albert. The males are very similar to those from the Kayonza forest, but with rather more extension of the blue of the hind wing into the area above the tails, thus somewhat like specimens from Kibali-Ituri. The females, on the other hand, belong to the *caerulea* type. Unfortunately, there is insufficient material to place these insects satisfactorily. (Pl. 15, figs. 105–107.)

***Charaxes smaragdalis elgonae* ssp. n.**

(Pl. 16, figs. 110–113)

MALE. Fore wing length 46 mm. *Upperside*. Ground colour blue-black with slight greeny-blue sheen at base ; fore wing discal blue bar well marked and wider than in *homonymus*, more like the N.E. Congo form from Beni ; spots as follows : beyond cell end, a trace of a blue mark below costa, followed by a narrow elongate one, then a rounded one ; the spot in 3 set well out from one above, quadrate or bluntly triangular, mark in 2 directly below but elongated at lower side and almost crescentic in shape, either separated from or almost touching the double spot in 1b the lower half of which is extended distad ; the blue mark in hind angle long and almost reaching the tornus ; post-discal spots well defined, the two subapical ones white, the rest blue and becoming more arrow-head shaped, the lower one fusing with the mark in 1b ; marginal spots whitish-ochre extend from apex to a double mark at tornus. Hind wing basal area black, shading to dark grey then lighter grey at inner fold ; discal area with a large blue patch, purer blue, not shot with violet as in *homonymus* and much more extended, reaching to the anal angle and to the upper tail, thus much as in the nominate race *smaragdalis* ; the patch represented in subcostal area by two widely separated blue spots ; black border thus restricted to upper half of the wing, but the submarginal bluish-white spots with a black surround in hind angle, complete ; marginal lunules blue with whitish ends ; margin very bluntly serrate ; tails short, upper 6 mm., lower 4 mm., largely blue or whitish, black edged. *Underside.* Darker than in *homonymus* but pattern as in the nominate race, black markings fore wing strong, with olive-ochre shading distad to discal black line, submarginal lunules and ocelli well marked ; tornal spot almost divided into two. Hind wing submarginal pale spots clear ; marginal olive-ochre lunules clear but not strong ; mottling on underside thus moderately strong.

FEMALE. Fore wing length 50 mm. *Upperside.* Bears a strong resemblance to that of *homonymus* but fore wing discal band narrower and white marks rather more separated by black veins ; spots in 1b smaller and more suffused with blue. Hind wing discal blue patch encroaches more into area of hind angle. *Underside.* Ground colour greyer and colder in colour than in the male, but markings very similar ; discal white bar fore wing well marked and white to area 1b.

Holotype male. E. UGANDA : Mbale District at Bufumbo Forest, W. Mt. Elgon, xii.1950 (*van Someren*). British Museum (N.H.).

Allotype female. Same locality, iii.1962 (*I. Grahame*). British Museum (N.H.).

Range : At present known only from the forests of W. Elgon, Bufumbo and Bumasifa, which are primeval, and harbour several " western " relicts, thus in contrast to the eastern and southern side of the mountain which is volcanic, with secondary forest.

Charaxes smaragdalis : intermediate, a cline between *elgonae* and *homonymus*

(Pl. 15, figs. 108, 109)

The species *smaragdalis* occurs sparingly in the Kapwaren Forest, N.W. Kenya, comprising the Kaimosi-Kakamega and the Kabras-Malaba forests. These lie almost mid-way between the forests of the Elgon massif and the Mau forests to the south-east.

Examples from the Kapwaren forest are a mixed aggregate ; the males are comparatively large, some exhibit an upperside pattern very similar to male *elgonae* Pl. 15, figs. 108–109, others show a strong tendency toward *homonymus* of the high Kericho-Sotik-Chepalungu forests.

Although male specimens have been taken occasionally, the female has proved elusive. A female taken many years ago is not now available for study, but one taken recently in the Kaimosi forest by Dr. Arthur Rydon has been placed at my disposal.

It will be noted therefore that this aggregate exhibits no constant features on which to define characters of a sub-species ; it thus seems advisable to leave it as a cline.

Up to date, no specimens of *smaragdalis* have been taken in the forests of central Uganda on the north shore of Lake Victoria (Mabira, Kampala, Entebbe, Mengo, Mawakota, Kamengo and Mpigi), so far as I know, in spite of considerable collecting with traps. There is however a specimen in the British Museum (N.H.) said to have been taken on Bavuma Island south of Jinja in Busoga, which seems to link up with the Kapwaren aggregate and those of the Katera area on west shore of Lake Victoria.

Charaxes smaragdalis homonymus Bryk

(Pl. 16, figs. 114–116 ; Pl. 17, figs. 117–119)

Charaxes smaragdalis orientalis Joicey & Talbot, 1917 : 272 [♂] nec Lanz, 1896.
Charaxes smaragdalis homonymus Bryk, 1939 : 444.

This race long known as *orientalis* Joicey & Talbot even by Carpenter (1950) and by Jackson (1951), must now be accepted as *homonymus* Bryk.

There has been some confusion as to what *homonymus* (*orientalis*) really is. The type, a male, came from Kericho, Kenya ; the female was unknown. Carpenter described what he took to be the female of this race, but his example came from Kikindu Hill, Kagera area between Uganda and Tanganyika Territory, on the other side of Lake Victoria, and later I shall deal with the race to which it belongs.

MALE. Fore wing length 43–46 mm. *Upperside.* Ground colour blue-black with strong blue basal sheen in fore wing ; discal bar blue spots as follows : two elongate spots of equal length, or lower one shorter and more quadrate beyond the cell ; spot in 3 bluntly triangular and set well out, followed by a larger spot in 2 whose lower edge projects distad, followed by a double fused spot in 1b and an elongate blue mark on the hind margin, usually well clear of the tornus ; post-discal spots usually well developed, two in subapex white, remaining spots blue, that in 5 directly below one above, that in 4–3 set in proximad, the one in 2 crescentic or triangular, that in 1b free or fused with the large discal spot in 1b ; marginal white or slightly ochreous spots usually well marked. Hind wing, basal area black shading to greyish on inner fold ; discal blue patch comparatively narrow, represented at subcosta by two separate spots, fairly even on the inner border, more curved on outer, but leaving a well defined black border which extends to the anal angle, black veins often cross the blue patch ; the black border carries a complete series of submarginal bluish white-centred spots ; marginal lunules blue with some white at tips, separated by dark veins ; margin with white fringe in interspaces, bluntly serrate ; tails short, upper 3–4 mm., lower 2–3 mm., mostly black. The blue areas in this race are slightly purply tinged, especially on the disc of the hind wing even in fresh specimens. *Underside.* Ground colour greyish-olive brown with olive-ochre filling between basal black lines and distad to the strong black wavy discal line ; markings in general similar to those of other races. Hind wing markings not very strong and the ochre shading not in great contrast so that the whole underside is not so speckled or mottled as in some races.

FEMALE. Fore wing length 47–51 mm. *Upperside.* Ground colour, distal half black, more brownish black in basal area ; discal bar white, moderately wide but not as wide as in western races ; slightly variable ; the white bar beyond cell includes the costa, subcostal mark narrow, second mark elongate, third mark more bluntly triangular ; spot in 3 set out at end of spot above, bluntly triangular, with outer side straight, oblique and in line with the outer edge of the larger spot below in 2 ; smaller double whitish marks in 1b with bluish scaling around, mostly distad ; marks at hind margin blue and well away from tornus ; post-discal spots at subapex elongate and white, remainder bluish and heavily obscured ; marginal spots fairly clear at tornus but obscured or absent beyond. Hind wing basal area black fading to greyish on inner fold ; discal patch blue with slight violet tinge, not very sharply defined proximally but clear-cut distally, represented at subcosta by two separate blue spots ; black border entire to anal angle carrying a submarginal row of bluish-white spots, double at anal angle ; marginal lunules blue at anal angle and tails then tinged with ochre to upper angle ; margin with white internervular fringe, bluntly serrate ; tails : upper 8 mm., lower 4–5 mm., mostly black. *Underside.* Ground colour as in the male or slightly paler ; markings similar but fore wing discal white bar strongly represented and with two well defined white marks in 1b. There is some variation in the amount of ochreous speckling or mottling.

Neallotype female. KENYA : Sotik district, Mara-Lolgogian Rd., Gori Forest, i.1961 (*H. D. van Someren*). British Museum (N.H.).

Range : The subspecies *homonymus* is an insect of the high rain forests of 6,000–7,000 ft. of the Kericho-Sotik area of Kenya. It has been taken at Kericho, Sotik, Mara, Kisii and near Lolgorian, always in or on borders of forest.

***Charaxes smaragdalis kagera* ssp. n.**

(Pl. 17, figs. 120–122 ; Pl. 18, figs. 123, 124, 127, 128)

Charaxes smaragdalis orientalis Joicey & Talbot ; Carpenter & Jackson, 1950 : 97 [♀ neallotype].

Carpenter & Jackson (1950) refer to this insect as *orientalis* Joicey & Talbot when they describe a female as of this race, which Carpenter took at Kakindu Hill, Budu, Uganda, 30 miles inland from the Lake shore. However, in the book " A Naturalist in East Africa " (1925), Carpenter states that Kakindu is on the north bank of the Kagera River, inland from Bukoba, just south of the Uganda border. The locality of the " type female " is of great importance because males of *smaragdalis* taken in the Kagera area, and at Katera and Tero forest nearby are *not* " orientalis ", though they resemble that race in certain respects.

MALE. Fore wing length 50 mm. *Upperside.* Ground colour blue-black with a greeny-blue sheen basally, discal spots comparatively large, larger than in subspecies *toro* and agreeing more with *homonymus* ; the spots in 1b large and confluent with the post-discal spots in the same area ; the post-discal spots well marked, the two subapical ones white, the upper one noticeably large. Hind wing discal blue area wider than in *homonymus*, but black border entire to anal angle ; the submarginal spots well developed, blue in region of tails, are white toward tornus ; admarginal lunules whitish ; tails slightly longer than in *homonymus* and with a distinct white line on lower half, upper tail 6 mm., lower 3–4 mm. *Underside.* More brownish in ground colour and less strongly mottled than in more western races with the dark markings less strong. Carpenter described the female, but he compared it with *butleri* of Sierra Leone and Gold Coast which is unfortunate.

FEMALE. Fore wing distal portion black ; basal area strongly scaled with violet and less dark than in *homonymus* ; discal white band comparatively narrow ; three spots beyond end of cell, spot in 3 bluntly arrow-shape with outer edge straight and in line with a longer spot in 2, spots in 1b small and set in line with outer end of spot above ; post-discal series hardly visible except the two subapical ones which are large and white, the upper one slightly concave as in the male. Hind wing ground colour, basal area not strongly defined from disc, being strongly greyish-violet ; discal area violet-blue restricted distally so that black border is entire and carries large ovoid white submarginal spots ; marginal lunules elongate, purply-white. *Underside.* Ground colour as in the male ; discal white band of upperside showing through ; post-discal spots clearer, ochreous-olive except for the two subapical ones which are white.

Holotype female, Kakindu Hill, north bank Kagera River, near Uganda border (*Carpenter*). Oxford Museum.

Allotype male. UGANDA : Katera forest, Masaka district, north of Kagera River mouth, viii.1935 (*T. H. E. Jackson*). British Museum (N.H.).

Range : The western shores of Lake Victoria from the Katera and Tero forests, the Kagera forests to Biharamulu at Geita. The forests on the west shore of Lake Victoria are almost at lake level and some are swamp-forests 3,700–4,000 ft. with higher elevations here and there.

Charaxes smaragdalis kigoma **ssp. n.**

(Pl. 19, figs. 131, 132, 135)

This is a small race closely related to the subspecies *kagera* of the low forests on the south-western shores of Lake Victoria, and likewise, *kigoma* is also associated with low lake-side forests but from the north-east of Lake Tanganyika.

MALE. Fore wing length 42 mm. (39 mm. in paratype). *Upperside.* General pattern very like *kagera* ; fore wing discal spots similar, but tending to be larger and more confluent at hind margin in 1a–1b in the type, though smaller and more separated in the paratype ; post-discal spots not strongly developed, except the two subapical whitish ones. Hind wing discal blue restricted and bordered by a complete black submarginal band, widest in 6, and still clearly defined above anal angle, and carrying a complete row of small blue spots ; marginal lunules blue ; tails short, 3 mm. and 2 mm. long. *Underside.* Pattern and mottling generally similar to *kagera*, but black markings less strong.

The female is unfortunately represented only by a pair of left-side wings which are reasonably intact, and give a clear indication to which group *kigoma* belongs.

FEMALE. Fore wing length 51 mm. *Upperside.* Ground colour black with just a slight bluish sheen at base ; discal bar white in upper two-thirds, spots in 1b with blue scaling proximally, wholly blue in 1a ; the discal bar is widest at 2, the spot above in 3 a longer elongate oval than in *kagera* ; post-discal spots represented by two white marks at subapex, the subcostal one narrow and linear, the other small and rounded ; no other visible spots. Hind wing basal area dull brownish-black ; blue discal area comparatively restricted with a black border well defined from upper angle to anal angle, widest in 6–7 ; submarginal white-centred blue spots in complete series, rounded in upper third then becoming more linear towards anal angle, admarginal lunules rather broken, blue with slight white at ends ; tails not robust, black in colour, upper 7 mm., lower 4 mm. *Underside.* Ground colour rather cold leaden colour, slightly " satiny "; pattern not strongly developed, but olive-ochre marks in post-discal line present and well developed in fore wing especially internal to the black ocelli.

Holotype male. TANGANYIKA : Mukuvu forest south of Kigoma, north-east shore Lake Tanganyika, v.1962. Japanese scientific Expedition.

Allotype female. Same locality, 25.v.62. Both deposited in British Museum (N.H.), by kind permission of the collectors.

Range : Taken in the low lake-side forest at Mukuvu, south of Kigoma, N.E. Lake Tanganyika. The extent of range is uncertain.

Charaxes smaragdalis metu **ssp. n.**

(Pl. 18, figs. 125, 126, 129, 130)

MALE. Fore wing length 43–45 mm., thus a small race. *Upperside.* Ground colour of fore wing strongly blue-black with slight greeny-blue sheen at base ; the blue areas more greeny-blue than in other eastern races, *elgonae* or *homonymus*, and more like *butleri* of Sierra Leone ; fore wing discal bar relatively strong, particularly in the hind marginal area ; three spots beyond cell : subcostal one a streak, next spot narrow and elongate, third more quadrate or triangular ; spot in 3 arrow-head shaped, that in 2 a long crescentic or " comma " mark. those in 1b elongate, and together with mark at hind margin extended basad and toward tornus, so that the patch here is large. (One paratype less prolonged basad.) Hind wing blue patch extended well into the hind angle to a point mid-way between tails, and represented in the subcostal area by an angular spot proximally, and a quadrate one distally, conjoined along their lower border ; black border thus limited to upper half of wing, carrying a submarginal series of bluish-white spots in the upper half, those in lower half with a black surround; marginal lunules in upper half bluish-white, blue towards anal angle ; margin bluntly serrate; tails, upper 5 mm., lower 3 mm., rather robust, largely bluish-white and black tipped. *Underside.* Ground colour darker than *homonymus* or *elgonae*; bars at base of fore wing strong, discal black lines moderately strong, but submarginal olive-ochre lunules and ocelli well marked ; tornal black mark heavily incised ; marginal lunules present but not strong. Hind wing marks as in *elgonae*, olive-ochre " mottling " strong, with black shading to outer side ; post-discal lunules strong ; submarginal whitish spots well marked ; marginal olive-ochre lunules well developed.

FEMALE. Fore wing length 47–49 mm. *Upperside.* Ground colour on distal half fore wing black, basal area more brownish with slight greenish tinge ; discal bar white, and rather narrow; costa above slightly white, subcostal spot very narrow, next mark elongate and projecting well beyond one above and the more quadrate one below at end of cell, spot toward base of 3 elongate ovoid or slightly triangular and set well out, its distal side oblique and in line with the outer side of the elongate triangular spot in 2, two white spots in 1b strongly suffused with light blue particularly proximad, with the blue extending toward the base and in line with inner point of spot in 2 which is also slightly blue in this area, blue mark at hind margin extended proximad and also distad toward tornus ; post-discal spots large and white in subapex, blue and rather indistinct or absent except that in 2 which is large, crescentic or rounded in shape, adjoining the large white discal spot in this area. Hind wing basal area black, shading to grey along the inner fold ; discal pale blue patch large, inner border rather diffuse along fold and base of cell, extending to anal angle and above second tail, represented in subcostal area by one large outer and one small inner spot ; border black, widest at 7 then tapering to upper tail ; submarginal spots clear and white at upper angle then blue, white centred towards anal angle, the spots surrounded by black and contiguous between tails ; marginal lunules strong and bluish from anal angle to above upper tail then mixed with some pale ochre ; extreme edge with white fringe between veins ; margin bluntly serrate ; tails, upper 6 mm., thin, lower 3 mm., mostly black. *Underside.* As in the male, but rather browner ; fore wing black lines strong, discal white bar well marked up to 1b ; post-discal lunules and ocelli well marked, two upper spots white ; tornal spot black and divided, two spots above strongly black centred. Hind wing black lines fine but ochre-olive shading strong, especially along the post-discal lunules which are dark centred ; submarginal whitish spots with black shading distally, well marked ; marginal lunules olive-ochre, well defined.

Holotype male. UGANDA : West Nile District, N.W. Madi, Forest of Metu Hills, v–vi. 1954, (*van Someren*). British Museum (N.H.).

Allotype female. Same data.

Range : This is the smallest subspecies of *smaragdalis* and occurs in the forested hills of the Metu area, of West Madi, in the West Nile district of Uganda. It probably extends into the Southern Sudan, on the Dadinga Mts. where Carpenter took a worn male which he tentatively placed to *homonymus* (*orientalis* Joicey & Talbot).

Charaxes schoutedeni Ghesquière **stat. n.**

Charaxes smaragdalis schoutedeni Ghesquière, 1933 : 5, pl. 1, fig. 2.
Charaxes butleri schoutedeni Ghesquière, 1933 : 5.

The type of *schoutedeni* Ghesquière, which I have before me, taken at Merodé, Salvator, Kasai, is the only known specimen. It was first described as a "form reg." (i.e. subspecies) of *smaragdalis*, then possibly as a subspecies of *butleri* Rothschild.

MALE. *Upperside.* fore wing basal areas greenish-blue covering the greater part of the cell and the basal areas of 1a–2 where the blue scaling merges into the discal blue spots which are here merged together forming a solid large blue patch, but those of 3 and beyond the cell are free. The post-discal spots in the subapex are well marked and white, the upper one long and slightly convex, the remaining post-discal spots are hardly visible at all, except those in 1b. The hind wing discal blue extends basad, more so than in nominate *smaragdalis*, but distally there is a broad black border carrying large submarginal blue spots. The marginal lunules are strongly greenish-blue and the tails very short. *Underside.* This is stated by Ghesquière to be identical with that of *smaragdalis leopoldi* Ghesquière but this is not strictly correct as it is duller and not so " mottled ".

Ghesquière notes that the upperside of the hind wing resembles to some extent that of *smaragdalis butleri* of Sierra Leone and Ghana, particularly in regard to the wide black border, and in this respect also to " *orientalis* " Joicey & Talbot = *homonymus* Bryk. This is certainly the case, but there the resemblance ends.

The squat thick-set shape of the body to which Ghesquière appears to attach considerable importance, is an artifact, due to partial decomposition and flattening of the thorax so that the wing attachments are extruded from their sockets. He suggests that *butleri* has a similar shaped body, but I have examined many examples of *butleri* and I cannot see that they differ in body shape from nominate *smaragdalis*. Thus the suggested re-allocation proposed by Ghesquière that *butleri* and *schoutedeni* are representatives of a species distinct from *smaragdalis* is untenable, because unsound.

The type of *schoutedeni* may be an extreme variant of *smaragdalis leopoldi ;* on the other hand, it exhibits certain characters which are suggestive of an affinity to *Charaxes bohemanni*. These are : upperside fore wing has two large subapical white spots, the upper one convex ; the remainder of the post-discal spots are suppressed ; the blue of the hind wing extends basad but does not encroach on the wide black border, this border with submarginal spots set more distad than in *smaragdalis* and the marginal lunules are set *on* the margin and not admarginal. *Underside.* The ground colour is matt as in *bohemanni*, and not strongly mottled and lined with olive-ochre as in *smaragdalis*. The insect bears no resemblance to *Ch. smaragdalis homonymus* Bryk except that it has a wide black border to the hind wing, and in this respect agrees with *smaragdalis butleri* Rothschild.

Dr. Berger (*in litt.*), is of the opinion that both *leopoldi* and *schoutedeni* are varieties of nominate *smaragdalis*, but, as I have pointed out, the *leopoldi* aggregate differ considerably from nominotypical *smaragdalis*. It is of interest to note that amongst some of the specimens I have examined a few had previously been determined as *butleri*, based, no doubt, on the wide hind wing black border.

It is unfortunate that examination of genitalia is of no assistance in separating these closely related species.

SYSTEMATIC LIST

Charaxes smaragdalis Butler

Charaxes smaragdalis smaragdalis Butler, 1865. Type female. Type locality : " Congo ". Neallotype male. 1869. Type locality : " Congo ".

Range : Nigeria, Cameroons, Gubun, French Congo, Equatorial lowland Rain Forest, Congo to Uelle. (Not Nandi as stated by Rothschild.)

f. *beni* forma n. Range : The Beni-Ituri area, eastern Congo.

butleri Rothschild, 1900. Type locality : Sierra Leone. Range : Sierra Leone to Gold Coast.

leopoldi Ghesquière, 1933. Type locality : Komi, Lodja district, Congo. Range : Southern west Congo, Leopoldville, Lower Congo, Sankuru, Kasai ; North Angola.

caerulea Carpenter & Jackson, 1950. Type female (f.n.) Jackson, 1951. Type locality : Kalinzu forest, Ankole, Uganda. Range : W. Uganda, forests of Kalinzu, Ankole ; Kayonza forest, Kigezi, S.W. Uganda ; the Kivu and Manyema districts Eastern Congo.

toro ssp. n. Type locality : Toro forests. Range : The forests of Toro, Mpanga and Kibali, Utwara, W. Uganda. Bugoma Forest, east side Lake Albert.

elgonae ssp. n. Type locality : Bufumbo forest, west Mt. Elgon, Mbale district, Uganda. Range : The forests of Western Mt. Elgon : Bufumbo and Bumasifa, Uganda.

ssp. near *elgonae* Range : The Kapwaren forests : Kaimosi, Kakamega, Kabras and Nandi Escarpment in Kenya ; Buvuma Island near Jinja, Uganda.

homonymus Bryk, 1939. Syn. *orientalis* Joicey & Talbot 1917 nec. Lanz 1896. Type locality : Kericho, Kenya. (Neallotype female, Carpenter & Jackson, 1950. Budu, Uganda . . . error = female *kagerae*). Range : The high forests of the Kericho-Sotik area in Kenya ; also Chepalungu and Mara.

kagera ssp. n. Type locality : Katera and Kagera river forests. Range : W. shore Lake Victoria ; low forests of Kagera River area, Bukoba to Geita in Tanganyika Territory, Katera and Tero forests Masaka district, Uganda.

kigoma ssp. n. Type locality : Mukuvu forest, Kigoma district N.E. Lake Tanganyika, Tanganyika Territory. Range : Only known from type locality.

metu ssp. n. Type locality : Metu, West Madi, West Nile district, Uganda. Range : The forested hills of Metu-Moyo, West Nile district of Uganda ; S.W. Southern Sudan.

Charaxes schoutedeni Ghesquière, 1933. Type locality : Merode, Salvator, Kasai, Congo.

Of doubtful affinity, this unique specimen exhibits characters which suggest relationship to *Charaxes bohemanni* Felder.

3. *CHARAXES CITHAERON* FELDER AND ITS SUBSPECIES

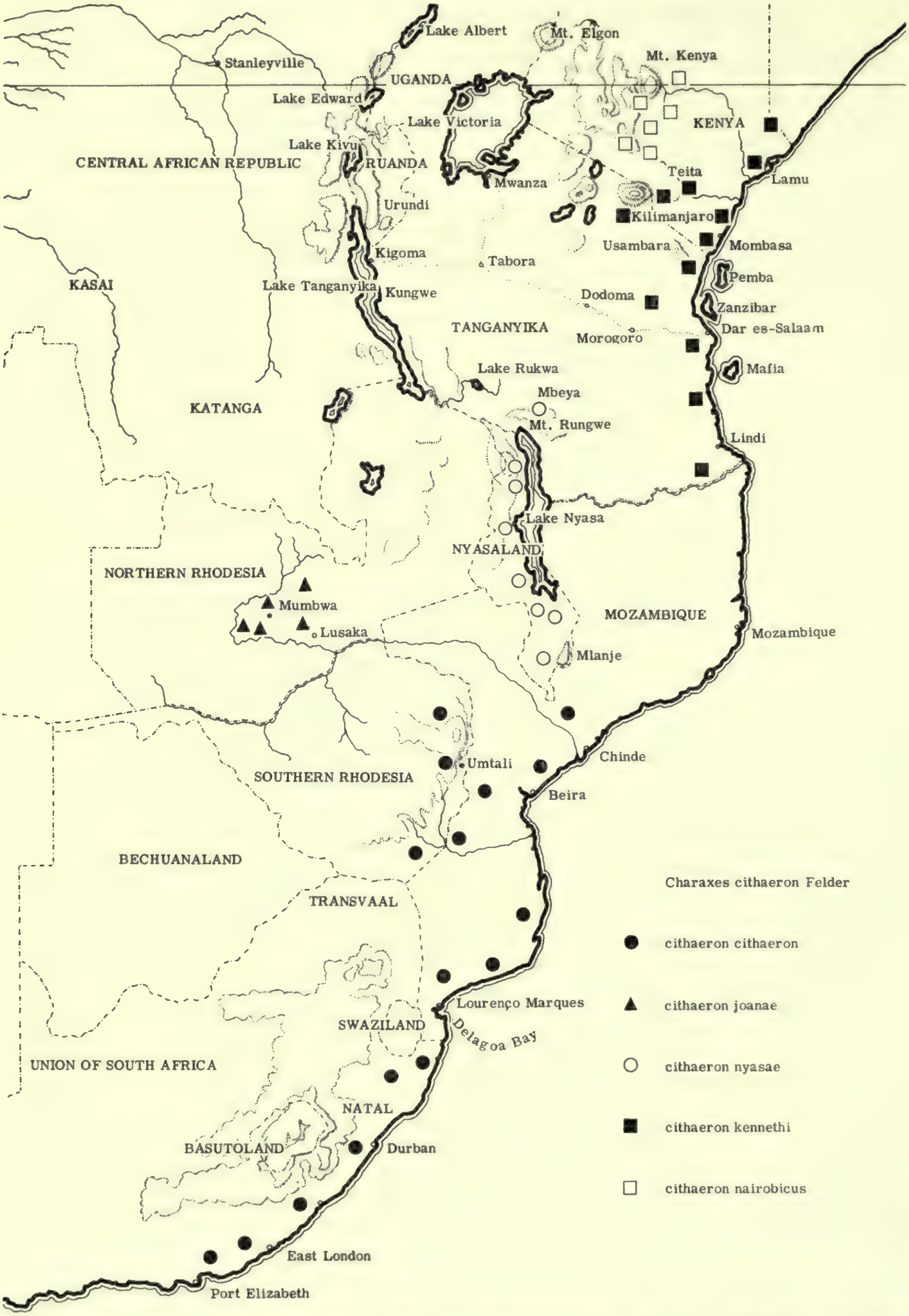
This species, so far as is known at present, like *Charaxes xiphares*, is more or less confined to the south-east and eastern regions of Africa, ranging from Pondoland in eastern Cape Colony northwards to Kenya. It bears a close resemblance to some of the northern subspecies of *Ch. xiphares* with which I have already dealt ; indeed, some races of *xiphares* were at one time considered to be subspecies of *cithaeron*.

Charaxes cithaeron was described in 1859, from Natal, and most of the early references to the species were based on material from the southern areas of its range. Rothschild & Jordan (1900 : 379) appear to have been the first to draw attention to the fact that specimens from the Kenya coast at Mombasa differed from Natal examples by having broader fore wing bars and wider hind wing patches, and remark that the differences pointed out may be found to be more or less constant. Poulton (1926 : 539) separated the Mombasa specimens as subspecies *kennethi*, with the type locality as Mombasa, but he appears to have considered the Kenya highland material as nominotypical *cithaeron*. In my papers on *Charaxes* of Kenya and Uganda (1929 : 17), I upheld the race *kennethi* as applicable to Kenya coast specimens, but placed the Kenya highland examples as *cithaeron cithaeron*, thus following Poulton's lead, but I was not entirely satisfied that this was correct.

Early in 1953, Dr. van Son informed me that he was about to review the subspecies of *Charaxes xiphares* and at the same time would be going into the races of *cithaeron* because there appeared to be some real confusion of the two, more particularly in regard to certain specimens recorded from Tanganyika. The results of his investigations were published in 1953 and on the evidence of material from the Nairobi area, Dr. van Son separated and described the Kenya highland race of *cithaeron* as ssp. *nairobicus*. At the same time he came to the conclusion that *kennethi* was not a good race but merely a wide barred variation of typical *cithaeron* from Natal, giving the range of the nominotypical race as from " Pondoland in eastern Cape Province to the coastal area of Kenya ". He thus assumed that there was a continuous distribution of this race through the length of Mozambique and Tanganyika and the coast of Kenya. He figured a female from Beira with a broad fore wing bar and wide hind wing patch as " form *kennethi* Poulton ", but in the text states that the specimen came from Pietermaritzburg, Natal! He does not figure a topotypical *kennethi* from the Mombasa area, but refers to a figure of this race which I had published (van Someren, 1929, pl. 83).

Although van Son reduces *kennethi* to the status of " form " because one does, on occasion, find a broad barred insect amongst southern material, he admits that the vast majority of Natal females have narrow fore wing bars and narrow hind wing patches. He does not compare the respective males in detail. That *kennethi* may merge with nominotypical *cithaeron* somewhere along the Mozambique coast is not disputed, but I personally have not been able to examine any material from northern Mozambique, north of Chinde, nor, I think, has van Son.

Dr. van Son is strongly of the opinion that a subspecies or geographical race to be valid, must be reproductionally isolated from its nearest neighbour ; this in the main does obtain, but there are cases where a widespread adaptable species


Lake Albert
Mt. Elgon
Stanleyville
Mt. Kenya
UGANDA
Lake Edward
Lake Victoria
KENYA
Lake Kivu
CENTRAL AFRICAN REPUBLIC
RUANDA
Lamu
Teita
Mwanza
Urundi
Kilimanjaro
Usambara
Mombasa
Kigoma
Tabora
KASAI
Pemba
Lake Tanganyika
Kungwe
Dodoma
Zanzibar
TANGANYIKA
Morogoro
Dar es-Salaam
Lake Rukwa
Mafia
Mbeya
KATANGA
Mt. Rungwe
Lindi
Lake Nyasa
NYASALAND
NORTHERN RHODESIA
Mumbwa
MOZAMBIQUE
Lusaka
Mozambique
Mlanje
Chinde
Umtali
SOUTHERN RHODESIA
Beira
BECHUANALAND
Charaxes cithaeron Felder
TRANSVAAL
● cithaeron cithaeron
Lourenço Marques
▲ cithaeron joanae
SWAZILAND
Delagoa Bay
○ cithaeron nyasae
UNION OF SOUTH AFRICA
■ cithaeron kennethi
NATAL
BASUTOLAND
Durban
□ cithaeron nairobicus
East London
Port Elizabeth

MAP 4. Sketch map of South-east and East Africa, showing distribution of *Charaxes cithaeron* Felder and subspecies.

with many food plants has split up into ecological groups each covering wide areas, but which are linked together, in minor degree by " clines "!

It is of interest to note that although van Son (1953 : 219, 221–2) places all *kennethi* as merely a form of the nominotypical Natal race, he places *maudei* Joicey & Talbot from an area intermediate between Natal *cithaeron* and true *kennethi*, as a race of *cithaeron*. However, I am satisfied that *maudei* is not a race of *cithaeron*, but of *xiphares*, and that *kennethi* and *maudei* occur together on the Usambara Range, at Amani, in Tanganyika (see pp. 233 and 206).

Dr. van Son has pointed out that in contrast to the general habitat of *xiphares* which frequents higher cool evergreen forests, *cithaeron* is found in the low tropical forests of the coast belt and hinterland, and in patches of savanna and gallery forest, thus inhabiting a diversity of forest types. Moreover, the range and diversity of its food plants is very considerable. The following food plants are recorded :—

In southern Africa : *Albizia* (2 species), *Acacia* sp., *Baphia* sp. (LEGUMINOSAE) ; *Celtis* sp., *Chaetacme* sp., *Trema* sp. (ULMACEAE).

In Kenya and Tanganyika : *Afzelia* sp., *Crabia* sp., *Albizia* sp. (LEGUMINOSAE) ; *Gymnosporia* sp. (CELASTRACEAE) ; *Hippocratea* sp. (HIPPOCRATEACEAE) ; *Grewia* sp. (TILIACEAE).

All these plants are very widespread and are associated with most forest types, and it is surprising therefore that the species *cithaeron* has such a comparatively restricted range, and, so far as is known, has not extended into the north-west of Tanganyika nor into the Congo.

In some areas of its range, the countries are subject to marked wet and dry periods, and it is not surprising to find some degree of seasonal variation in *cithaeron* and I shall refer to this later.

Through the willing co-operation of many correspondents, I have been able to bring together a very large amount of material representative of the species throughout its known range ; these include the eastern Cape, and Natal, southern Mozambique, Southern Rhodesia, Nyasaland and Northern Rhodesia, southern and eastern Tanganyika and Kenya.

In analysing this material into groups, I have been guided by what appears to be the predominant characters of each, in both sexes, and the stability of them. In every group there are variations, tending one way or another and some evidence of seasonal modification. In the descriptions which follow I have selected fresh examples exhibiting constancy of the chief characters, and where minor differences occur, these are mentioned. I shall also refer to, and wherever possible figure, outstanding variations within the series.

Charaxes cithaeron cithaeron Felder

(Pl. 19, figs. 133, 134, 136, 137 ; Pl. 20, figs. 138, 139)

Charaxes cithaeron Felder, 1859 : 398, pl. 8, figs. 2 ♂, 3 ♀.
Charaxes cithaeron Felder ; Rothschild & Jordan, 1900 : 379.

A detailed description of the species is given by Rothschild & Jordan (1900 : 379), based presumably on south African material, but since the range of the species is given as "from Natal northward to Nyasaland, German and British East Africa" it may include material subsequently separated off as distinct subspecies. It is thought that a redescription of topotypical Natal material is desirable.

MALE. Fore wing length 41–45 mm., majority 43–44 mm. *Upperside.* Ground colour blue-black with a strong blue sheen mainly on basal half ; fore wing costa brownish on basal portion ; two rows of comparatively small blue spots, discal and post-discal ; the spots in the former are two elongate beyond end of cell (very rarely a trace of a subcostal blue line), spots in 3–4 more rounded and set out distad, spot in 2 usually vestigial, often absent ; usually no spot in 1b, but if present rather diffuse ; elongate blue line in 1a on hind margin usually free, but may be contiguous to, but not fused with post-discal spot above ; post-discal spots run parallel to outer margin of wing and are comparatively small ; subapical spots white, remainder blue, often vestigial. Hind wing black, slightly shot with blue distally, but dull toward base ; inner fold blackish at base shading to greyish at anal angle ; discal light patch comparatively narrow, whitish on inner half toward fold but strongly bluish above and distally, extending from 4–5 where it is narrow, then widening towards inner fold, sometimes represented in 5 by a rounded, separate or contiguous, blue spot and by a whitish-blue subcostal spot rather diffuse or often absent ; submarginal row of blue spots, angular or elongate, double at anal angle, becoming small and separate or fading out toward upper angle ; marginal lunules buff to ochreous, more greenish at anal angle separating toward upper angle ; fringe narrowly white, broken by ends of veins ; margin dentate ; tails long and thin, upper 5–8 mm. (seldom longer), lower 3–4 mm., black edged, centre line buff. *Underside.* Light greyish-olive with a slight tawny bloom over base of fore wing and disc of hind wing ; black transverse lines at base fore wing fairly constant as regards position but varying in thickness ; sub-basal bar in cell almost straight, second and third bars slightly angled ; a double bar at end of cell ; thicker sub-basal bars in 1b and 2 almost straight or crescentic ; a zigzag black line outlines the inner edge of the irregular ochreous-olive discal bar ; the post-discal marks of upperside here represented by two whitish subapical spots followed by rounded or lunate ochreous marks increasing in size, the lower ones encircling the tornal black spot and the one above ; the tornal mark somewhat kidney-shaped, indented on the outer aspect ; ochreous marginal spots complete but small. Hind wing basal lines thin, usually double and enclosing ochreous ill-defined bands, that in sub-basal area of subcostal in 8 almost straight, that in 7 set out and contiguous with marks crossing cell and somewhat S-shaped, and not extending into 1c ; a discal zigzag narrow black line runs along the inner edge of the more ochreous-olive discal line ; post-discal spots ochreous, dusky on outer aspect and increasing in size from costa to anal angle, are mostly crescentic, that at anal angle double ; submarginal spots, purply-mauve proximally, are increasingly purply-black distally terminating in double spot at anal angle ; marginal lunules ochreous with increasing green scaling between tails and anal angle.

FEMALE. Fore wing length 44–50 mm., somewhat variable, usually about 48 mm. *Upperside.* Ground colour blue-black on distal portions, bluer along proximal edge of fore wing white band ; browner toward base ; (old specimens are generally browner, especially in basal area). Fore wing discal white band curved, extending from costa to hind margin ; outer border more evenly curved than inner, white scaling on costa extending basad for about half its length ; three elongate white marks at end of cell, middle one longest and projecting distad, bases of all three in a line ; spot in 3 bluntly triangular and set out from spot above at about mid point, its outer border oblique ; spot in 2 more elongate, proximally rounded and in line with spot above, but outer oblique edge continuous with that above and in same line ; mark below shorter, outer edge in line with one above but inner edge reaching to about middle only, while the lower marks in 1b and mark in 1a extend proximad, the last three at an angle to spots above, so that the inner border of the discal band has a marked double kink, at vein 2 and in line with the lower arm of the cell ; the distance of the band in 1a–1b from the tornal margin is wide, though slightly variable, usually 7–10 mm., often the latter. The white mark in 1a may be slightly blue scaled ; postdiscal spots variable in number, but always with two large subapical, white or buff, the spots in 4–3 if present rather indistinct ; margin with hardly any indication of spots, but there may be two at tornus. Hind wing with large bluish-white discal patch shaded with bluish-violet scaling distally, inner border almost straight but rather diffuse, usually represented on the subcosta by one discrete spot or two contiguous spots, outer border of patch more curved and merging into the inner fold above anal angle ; discal patch variable in width, but on an average is 10–11 mm. wide in area 4, but is often considerably narrower. When the band is narrow, there may be an indication of whitish post-discal spots in 3–4. The submarginal row of rounded or triangular blue spots with white centres may be complete or fading out at upper angle ; marginal ochre lunules may be contiguous or separate, fading out at upper angle ; marginal black with hardly any indication of a white fringe ; tails mostly black, thin, variable in length, upper 6–10 mm., lower 4–6 mm. *Underside.* As in the male but fore wing discal band well marked and stopping short in 1b ; the black lines more developed; post-discal lunules of hind wing often more strongly marked ; zigzag discal line may be strongly edged whitish, almost forming a bar, but is usually narrow.

Variations. FEMALES. An extreme variant may have the streak in 1a of discal bar only just indicated while the two spots in 1b are reduced to small dots, the discal bar is thus incomplete and shortened in its posterior portion. A further variant has the discal band complete but reduced to half the normal width, conversely a specimen from Dondo, Mozambique has an exceptionally wide fore wing discal band, the increase in width being due to an extension of the white marks in 2–3 basad, and reaching the cell, while that in 1b is extended basad only slightly less. The proximal border of the band is far less indented and more evenly curved than normal.

MALES. There is little variation in the upper side. A very small minority may have larger discal blue spots in the fore wing than normal, and the blue streak in 1a may link up with the lower spot in 1b. In the hind wing the whitish blue patch may not be represented beyond cellule 4 and the light subcostal spot is absent.

Range : The nominotypical race extends from Pondoland up the east coast to Natal, Zululand and Swaziland to Beira in south Mozambique (Dondo and Amatongas) then westward to the eastern side of S. Rhodesia. It has usually been presumed that the species has a continuous distribution through the northern part of Mozambique to Tanganyika and beyond, but I have been unable to trace any specimens of the nominotypical race north of the Zambesi Valley.

Charaxes cithaeron joanae ssp. n.

(Pl. 20, figs. 140–145)

The species *cithaeron* does not appear to have been recorded from the western half of Northern Rhodesia until recently, when a single male was captured and forwarded to me by Mrs. J. Wedekind of Mumbwa. Mumbwa is situated west of Lusaka in the bend of the Kafue River. The country thereabouts is largely savanna with small patches of riverine or gallery forest.

The specimen aroused my interest for it appeared to differ considerably from other known races of the species and I urged my correspondent to try and obtain further material including females ; at the same time I drew Dr. Cottrell's attention to the capture.

The species does not appear to be common in the area, but the result of the combined efforts of these two collectors has been the taking of a dozen males and females over a period of almost two years ; they substantiate the distinctness of this race.

The male differs from the nominotypical Natal race by the larger spots of the fore wing both discal and postdiscal, by the larger more conspicuous marginal spots ; by the larger hind wing discal patch, larger submarginal spots and more conspicuous marginal lunules. The female differs in the fore wing by its wider more solid discal band, larger sub-apical white spots, more conspicuous marginal ochreous spots, and in the hind wing by the considerably larger discal patch, larger blue submarginal spots and broader marginal ochreous border.

MALE. Fore wing length 38–45 mm. (Mumbwa specimens March–April average large, 45 mm. Chisamba, Lusaka area July, 45 mm., October–November, 38–43 mm. This difference in size combined with differing underside characters may be seasonal.) *Upperside.* Fore wing ground colour strongly blue-black with strong greeny-blue sheen at base ; discal spots arranged as in nominotypical *cithaeron* but always considerably larger, those in 1b usually large and may be fused with the elongate blue streak in 1a and usually touching the large post-discal spot in 1b ; post-discal spots larger and well marked, subapical white spots larger, other spots blue ; marginal spots well developed, white or creamy. Hind wing basal areas black, distal border blue-black ; discal patch constantly wider than nominotypical specimens and strongly suffused with bright blue in upper and outer borders, whitish towards inner fold which is greyish to greyish-white ; the patch is represented at the costa by a white or bluish-white spot. Most specimens exhibit a series of white or ochreous-tinted spots on upper portion of outer border of the discal patch or along the entire border to just above the anal angle ; black border with well developed blue arrow-head marks, white centred ; marginal lunules orange-ochre separated by ends of black veins ; tails relatively short, upper 4–5 mm., lower 3–4 mm. *Underside.* Much duller and lighter (almost uniform ochreous putty-coloured in dry season specimens), less strongly patterned than in Natal specimens, the black lines finer ; the fore wing tornal occular spot smaller and almost or completely divided into two ; the post-discal dark line in hind wing is, however, more apparent against the paler ground.

FEMALE. Fore wing length 47–52 mm., majority 50 mm. (There is some seasonal size variation as noted in the males.) The outstanding character of this race is the very wide, solid fore wing white band, and the large discal patch in hind wing. *Upperside.* Ground colour less blackish, the basal areas more brownish (fading to olive-brown in old specimens). Fore wing pattern much as in the nominate race but bolder, the discal curved bar uniformly wider throughout its length, the inner edge being less indented in area 3 due to spot there, being large and its base less set-out ; the three elongate marks beyond the cell longer and very frequently with a white streak subcostal in the cell ; white scaling on costa more extended ; the lower white blocks in 1a–3 often with white scaling along the veins proximally, giving the inner border a " rayed " appearance ; post-discal series of spots often entire, the two subapical ones large, the upper one arrow-head in shape, the lower more rounded or oval, the remainder whitish or slightly tinted ochre, that in 2 contiguous with the discal mark ; discal bar in 1a–2 extends much nearer the tornus than in the nominate race ; marginal spots clearly indicated, often large, double in 1b, slightly ochreous. Hind wing discal patch very large, extending from the costa to the anal angle and on the inner border merging with the greyish of the inner fold ; inner border almost straight but diffuse, with a defined indentation at the costal spot, outer border more curved, with evidence of post-discal spots in 7–5, the upper one free, the others merging into the border of the patch ; centre of patch whitish but margins suffused with violet-blue to mauve scaling. The large size of the patch reduces the width of the outer black border which carries submarginal blue spots, large and well developed and in continuous series from upper angle to anal angle. Marginal lunules well marked, ochreous or creamy ; margin moderately dentate, and white fringe obvious ; tails thick at base, more robust than in Natal specimens ; length, upper 6–8 mm., lower 4–7 mm. *Underside.* There appears to be some seasonal variation in colour and markings : specimens taken during March–April at Mumbwa are boldly lined, those captured during August–November are very pale and lightly marked.

Discal white bar of upperside here reproduced and extending to the hind margin ; post-discal spots rather diffuse ; dark tornal spot less marked and almost divided and reduced in size. Hind wing ground colour paler than nominate race, dark lines almost obscured, but post-discal ochreous marks with dusky distal scaling more obvious, but the marginal lunules may be obscured.

Holotype male. RHODESIA : Mumbwa, west of Lusaka, 15.xii.1961 (*Mrs. J. Wedekind*), after whom this race is named. British Museum (N.H.).

Allotype female. Same locality, iv.1962 (*Mrs. J. Wedekind*).

Paratypes : Mumbwa and Lusaka in Coll. B.M. and Coll. Cottrell, taken by Mrs. Wedekind and C. B. Cottrell.

Range : All material taken so far has come from the Mumbwa-Lusaka area in the region of the Kafue bend in the western block of N. Rhodesia. It may extend eastward and northward, in suitable localities. At present there appears to be complete separation from the Nyasaland race.

Charaxes cithaeron nyasae **ssp. n.**

(Pl. 21, figs. 147–149 ; Pl. 22, figs. 153–156 ; Pl. 23, figs. 161–163)

The general facies of this race bears some resemblance, especially in the females, to the race *joanae* of western Rhodesia. The females are, in the main, broad banded. The males exhibit a larger hind wing patch than in the Natal race and they are a brighter insect of comparatively large size.

The male differs from the nominotypical race and from *joanae* by its brighter blue sheen especially on the forewings, the spots being larger than those of the Natal race but not so large as in *joanae*, and these spots having a more greeny-blue tone, especially on hind margin. The hind wing discal patch is larger than those of the Natal race, slightly smaller than in *joanae* but with a strong greeny-blue border on upper and outer sides and the marginal ochreous border conspicuous. The female is larger than Natal specimens as a rule ; the ground colour not so dark, the fore wing discal band wider, more solid but not so wide as in *joanae* ; the post-discal spots larger and more complete ; the marginal ochreous spots present but small ; hind wing discal patch large, shaded with lavender and with irregular outer border with post-discal spots visible ; the submarginal spots large, marginal ochreous border conspicuous ; the tails long.

MALE. Fore wing length 43–48 mm., majority 45 mm. *Upperside.* Ground colour a brighter blue-black than typical Natal specimens, with a strong tinge of green sheen in basal area. The blue spots are, on an average, larger than in nominotypical *cithaeron*, but not as large as in *joanae*. The discal spots of fore wing are complete from costa to hind margin ; post-discal spots well developed and the line more inclined proximad in area 3 giving the line a distinct inward kink ; also the margin more concave ; two upper subapical spots white, remainder blue-green and in a majority of specimens discal and post-discal spots approximate or fused in 1b ; margin of the wing with small but distinct creamy spots, occasionally these spots are as large as in *joanae*. Hind wing basal area black, inner fold ashy-grey ; the dark border with greeny-blue sheen ; discal patch comparatively large but does not extend towards costa so much as in *joanae*, but is represented by one discrete spot at costa and by one or two discrete post-discal spots ; upper and outer borders of the patch with strong greeny-blue suffusion, brighter than Natal specimens and this brightness is retained even in old specimens taken in 1928 ; black border with a complete series of submarginal blue spots, usually large, but sometimes small ; marginal lunules sometimes complete or usually divided by internervular rays, ochreous with some greeny scaling in the region of the tails and at anal angle ; tails thin and longer than in *joanae*, upper 6–7 mm., lower 4–5 mm. *Underside.* Ground colour colder darker grey, less brownish than Natal race, and much darker than the dry season form of *joanae* ; pattern as in nominotypical *cithaeron*, but post-discal row of fore wing spots slightly more kinked proximad as on upperside.

FEMALE. Fore wing length 47–51 mm., mostly 50 mm. *Upperside.* As already stated, these females bear a resemblance to female *joanae* in that the fore wing is wide and the hind wing patch large. Fore wing discal white band less indented on the inner margin than Natal race, due to the larger marks in 1b which extend proximad, and the frequent white scaling at end of cell ; streak in 1a suffused with blue as is proximal end of mark in 1b, the conjoined marks here, being solid and hardly if at all indented on the distal end ; post-discal spots well developed, the supapical ones large and white, the remainder suffused with bluish and often present in 2 or even 1b. Hind wing as in *joanae* ; discal patch large, extending up to the costa in discal row and often with a post-discal series of spots, free in subcostal area but merging into outer border of patch giving it a rayed or dentate outline, thus not so defined as in *joanae*, outer border strongly suffused with lavender-blue scaling ; dark distal border though relatively narrow is ill defined on its inner edge and carries a complete row of large lavender-blue white centred spots, these more bluish at anal angle ; marginal lunules creamy or ochreous, usually divided at mid point and separated by ends of dark veins ; white fringe strongly marked in most specimens ; tails moderate in length, upper 6–9 mm., lower 5–7 mm., mostly black, upper one with ochreous mid line. *Underside.* Ground colour as male but pattern bolder as a rule but variable ; discal and post-discal marks bold in fore wing, the former continued to hind margin. Hind wing discal and post-discal lines and spots bold, but may be suppressed on discal line. This variation may be seasonal.

Variations. Although the vast majority of specimens exhibit a marked degree of constancy in pattern, one or two specimens of both sexes show a departure from the rule. Thus one male (Pl. 21, fig. 149) exhibits a reduction in the size of the fore wing spots and an accompanying restriction of the hind wing patch. Two other males (Pl. 22, figs. 153, 154) exhibit a fore wing pattern within the normal range but the hind wing patches are narrow and unusual and the undersides are abnormal. Females (Pl. 22, figs. 155, 156), with a reduction in the fore wing and hind wing spots and discal patch suggest a trend toward the southern nominotypical race.

Holotype male. NYASALAND : W. shore Lake Nyasa at Nkata Bay, 1,800 ft., 4.iv.1958 (*J. D. Handman*). British Museum (N.H.).

Allotype female. Same locality, 2.v.1962 (*J. D. Handman*). British Museum (N.H.).

Paratypes : Nkata Bay; Mlaye and Mlosa Stream foothills Mlanje ; also at Monkey Bay.

ab. ***griseus*** Schultze

(Pl. 21, fig. 146)

Charaxes cithaeron ab. *griseus* Schultze 1913a : 82.

Through the kindness of Dr. Hannemann, I have been able to examine the type specimen described by Schultze from Manow, southern highlands Tanganyika, north of Lake Nyasa.

Upperside. The specimen is normal in size and markings, but the ground colour of both fore and hind wings, instead of being blue-black is a curious semi-translucent brownish-black suggestive of a lack of development of melanin pigment in the scales. The *underside* ground colour is greyish-brown without olive shading ; the black lines are thin and the ochreous spots though present are not strongly indicated. The specimen is old, but the date of capture is not given on the data label. The tails are long and thin, upper 7 mm., lower 5 mm., thus considerably longer than in *Ch. xiphares brevicaudatus* Sch. which also occurs in the Manow area and which bears a superficial resemblance to *cithaeron*.

I have seen no other specimens from north of Lake Nyasa, but this specimen seems to fit in with *cithaeron nyasae* from Lake Nyasa, and is placed to this race.

Range : From the north-western shores of Lake Nyasa at Nkata Bay 1,800 ft. south to the region of Zomba and the foothills of Mlanje, and neighbourhood. I have no records of the species from the eastern shores of Lake Nyasa.

Charaxes cithaeron kennethi Poulton

(Pl. 22, figs. 157, 158 ; Pl. 23, figs. 164–168)

Charaxes cithaeron kennethi Poulton, 1926 : 539.

This subspecies was accepted as valid up to 1953 when Dr. van Son suggested that the nominotypical race extended " over the whole eastern coastal area from Pondoland to Kenya " and that *kennethi* was but a wide banded female form to be found in the southern areas of nominate *cithaeron*. I have already commented on the evidence he adduces in support of his views, in the introduction to this section, and would here add that Dr. van Son appears to have based his views mainly on the female, disregarding the male of the race.

MALE. Fore wing length 44–47 mm., majority 46 mm. *Upperside.* Ground colour dark blue-black with just a slight or no green sheen at base; fore wing base of hind wing black, inner fold dark to light ashy-grey. Fore wing discal spots usually well marked, complete in series to 1b, but some variation in length of marks ; post-discal series generally larger than in Natal specimens ; white subapical spots larger ; spots in 1b usually free, but if large and angled may meet discal spot in same area ; marginal spots if present, small, double in 1b ; fringe white, interrupted by dark ends of veins. Hind wing discal patch white with blue suffusion on upper and outer borders, moderately wide and whiter than in nominotypical race, usually represented at subcosta by a white or bluish discal spot quite free ; on the upper and outerside by one or two post-discal bluish-white discrete spots ; distal black border with large submarginal angular blue spots with white centres, double at anal angle and brighter blue ; marginal ochreous line broken by a dark mid-line and separated by ends of dark veins ; fringe narrowly white ; tails long, upper 6–9 mm., lower 5–6 mm. seldom shorter. *Underside.* Ground colour slightly darker than Natal race, as a rule but pattern less strongly marked ; dark lines and ochre-olive shading less broad ; post-discal spots fore wing less marked.

FEMALE. Fore wing length 47–51 mm., majority 50 mm. *Upperside.* Distal portions of wings black, proximal more brownish, fore wing discal bar slightly variable, but majority wider than in Natal specimens, the inner border of bar less indented and irregular due to the longer and larger marks in 1a–1b, the hind marginal blue streak shaded lavender-bluish and the inner portion of mark above in 1b also lavender, moreover the third mark beyond the cell is also more elongated ; post-discal spots in the subapex large and white and this series usually stops in 4, but may extend to 3 but in more diffuse form, most of the spots covered with dusky scaling ; margin of wing without light spots, but fringe narrowly white. Hind wing discal patch usually large, but not so large as in *nyasae* or *joanae*, but the average larger than Natal specimens, the whole suffused with lavender scaling, the inner border extends to the costa where the mark is sharply defined proximad while the outer border is more dyslegnic and somewhat rayed with white scaling along the veins and one or two spots of the post-discal series may be present in 6–7 ; distal black border carries a series of triangular or elongate lavender-blue marks with white centres, double at anal angle and bluer ; marginal ochreous line usually present but strongly divided by black at mid-point and separated by ends of veins ; fringe narrowly white interrupted by dark veins ; margin slightly dentate ; tails long and slender, upper 9–10 mm., lower 7–8 mm., may be black or with narrow pale streak for entire length. In some specimens the submarginal spots are exceptionally small and obscured. *Underside.* Ground colour dark cold olive-grey or with a slight ochre-brown tinge ; discal white bar well marked ; post-discal spots obscured (except for two subapical) in the dark form, or more conspicuous when the ground colour is paler and the zigzag discal line in hind wing is more defined and the post-discal spots show up.

Variations. A contrasting rare variation in the female is figured (Pl. 23, fig. 167). Associated with this subspecies is material taken in the Newala district of southern area Tanganyika, north of the Ruvuma River. These specimens though not quite typical link up with material from Morogoro inland from Dar es Salaam on the central railway line (Pl. 23, figs. 164–168).

Range : This race, in typical form, ranges from the coastal belt of Kenya and Tanganyika north to the south Somali border at Milimani extending inland to Kibwezi, Voi and the Teita Hills and the Mutha district of Ukambani, to Makueni along the riverine forest patches. It also occurs in the foothills of Kilimanjaro at Moshi and Arusha and noted at Namanga. Specimens from Arusha and Manyara are less stable than typical coast material.

Charaxes cithaeron nairobicus van Son

(Pl. 21, figs. 150–152 ; Pl. 22, figs. 159, 160)

Charaxes cithaeron nairobicus van Son, 1953 : 220.

MALE. Fore wing length 45–48 mm., majority 47–48 mm. *Upperside.* Fore wing ground colour very dark purply-blue-black or deep blue-black with a greenish sheen at base in side light ; hind wing black at base with some blue-green reflections on distal border ; fore wing discal blue spots large, strongly blue or with a purply sheen, the series in a distinct curve, as spots in 1b are set in basad and streak in 1b is large and extends inward well beyond spot in area above ; post-discal spots all well developed, the two subapical ones white, the remainder blue, the two marks in 1b approximating on inner edge and forming a cordate or arrow-head mark ; marginal ochreous or creamy spots well developed, often elongate-quadrate, separated by the dark veins ; tornus with double spot. Hind wing discal patch large, whitish towards inner fold but strongly suffused with blue on upper and outer borders, represented on subcosta by a large diffuse bluish spot and in the post-discal line by a distinct subcostal spot followed by a larger one in area below, these two spots free or occasionally suffused over with blue scales, very often these spots and those within the outer border of patch have a strong ochreous tint which shows up clearly ; submarginal spots usually large and somewhat angular, the bright double spot at anal angle often conjoined ; margin usually broadly ochreous divided by the dark veins giving the edge of the wing a dentate appearance ; fringe narrowly white ; tails robust and short, upper 4–7 mm., lower 3–5 mm. largely ochreous with only a narrow black edge. *Underside.* Slightly variable but ground colour usually dark olive-greyish with a tawny bloom, but it may be generally dark olive-grey in which case the white lines and ochreous spots show up conspicuously. In the paler form the hind wing pattern is largely obscured especially in the discal and post-discal areas and along the submargin, but the ochreous marginal border is broad and conspicuous.

FEMALE. Fore wing length somewhat variable, denoting season and food plant ; in a dry season resultant specimens are stunted. In a very long series the wing length varies from 46–54 mm., but the large majority are 50 mm. There is a similar variation in the upperside pattern in respect to the width of the fore wing discal white bar and the development of the post-discal spots ; in the hind wing in the size of the discal patch and the sub-marginal blue spots. However, the overall characters of the Kenya highland race hold good. It is a large race and in both sexes the pattern is bold, particularly in the hind wing discal patch which not infrequently has a tinge of ochreous in the upper and outer borders corresponding to the position of the incorporated post-discal spots. The submarginal row of blue spots with white centres is usually strong and the margin is boldly ochreous. *Underside*. Exhibits some variation in ground colour being either dark olive-grey with bold lines and ochreous shading and the zigzag line through the disc of hind wing well developed often forming a conspicuous bar. In specimens with paler ground colour the pattern is finer and the ochreous suffusion results in suppression of a strong pattern. Some of these variations are shown on Pl. 21, figs. 150–152.

Range : The forests of the Kenya Highlands east of the Rift Valley, the Aberdares and Mt. Kenya, the upper Kikuyu forests and in the drier forests around Nairobi-Ngong where the species is plentiful. It also occurs in the riverine and gallery forests extending southward into Ukambani where there is some evidence that it may make contact with the subspecies *kennethi*.

SYSTEMATIC LIST

Charaxes cithaeron Felder

Charaxes cithaeron cithaeron Felder, 1859. Type locality : Natal. Range : from Pondoland S.E. Cape Colony to Beira and Dondo (perhaps beyond) in Mozambique, extending inland to the eastern flank of S. Rhodesia.

joanae ssp. n. Type locality : Mumbwa, western area N. Rhodesia. Range : at present known only from the Mumbwa-Lusaka area within the Kafue Loop, associated with areas of savanna and riverine forest.

nyasae ssp. n. Type locality : Nkata Bay, west shore Lake Nyasa. Range : all material so far examined comes from the western shore of Lake Nyasa from Nkata Bay then southwards to Cholo, Zomba, and the foothills of Mlanje. It may range into the adjoining eastern side of Lake Nyasa in Mozambique, but not north of the Ruvumba River.

ab. *griseus* Schultze. Type locality : Manow, north of Lake Nyasa.

kennethi Poulton, 1926. Type locality : Mombasa, Kenya Coast. Range : the forests and woodlands along the Kenya coast from Milimani north of Witu, south to the Usambara range in Tanganyika then to Morogoro and the Lindi area, north of the Ruvuma River. In Kenya, it extends inland along the Tana-Sabaki Rivers to Voi and Kibwezi, the Teita Hills and the foothills of Kilimanjaro, Moshi and Arusha.

nairobicus van Son, 1953. Type locality : Nairobi, Kenya. Range : the highland forests E. of the Rift Valley to Mt. Kenya, Meru and the Njambeni Hills ; also in riverine forests in N. Ukambani, and patches of forests on the hills.

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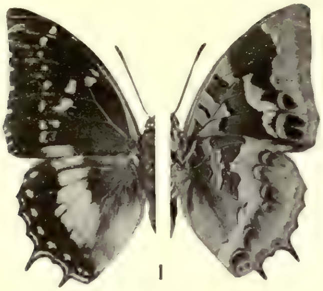
PLATE 1

Charaxes xiphares Cramer

FIGS. 1 and 2, *xiphares* Cramer, ♂ and ♀ (Cape Province, van Stadens and Knysna), upper and undersides. FIGS. 3 and 4, *thyestes* Stoll, ♂, Type of *reducta* Rothschild (W. Pondoland), upper and underside (Photos B.M. (N.H.) Nos. 31251 & 31252). FIGS. 5 and 6, *thyestes* Stoll, ♀ ♀ (Hogsback, Eastern Cape Province), upper and undersides. FIGS. 7 and 8, *thyestes* Stoll, ♂, Type of *elatias* Jordan (Port St. Johns), upper and underside (Photo B.M. (N.H.) Nos. 31247 & 31248).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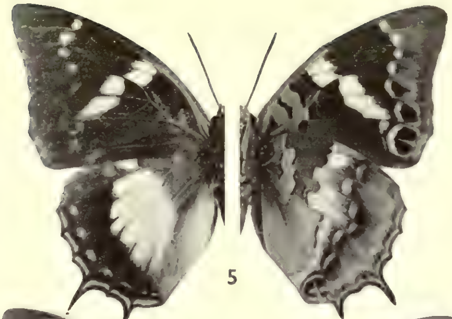
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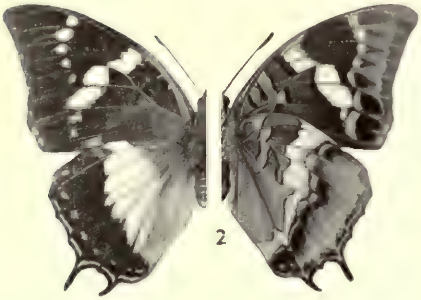
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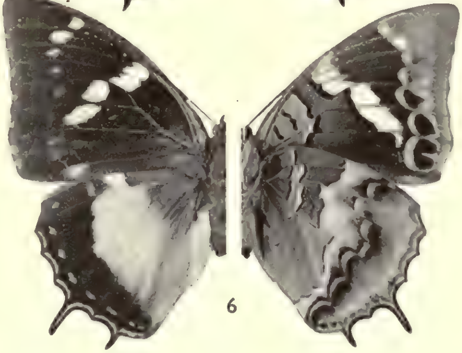
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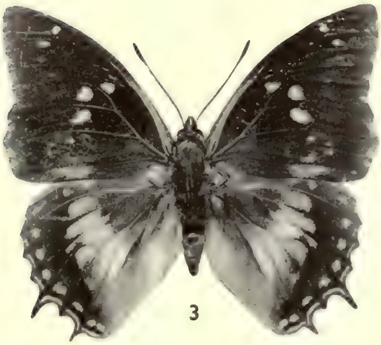
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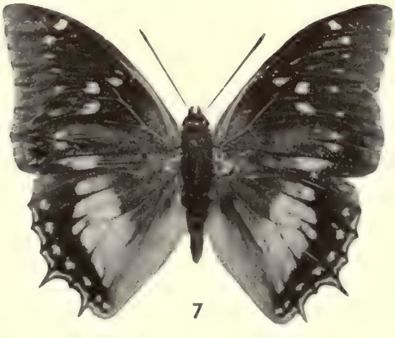
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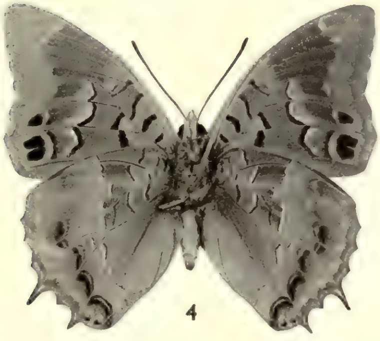
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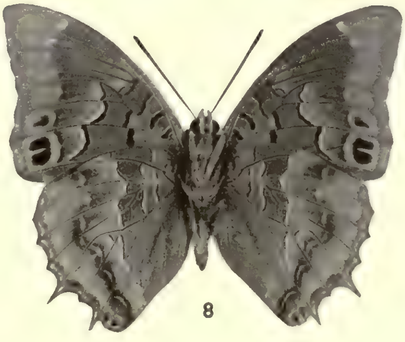
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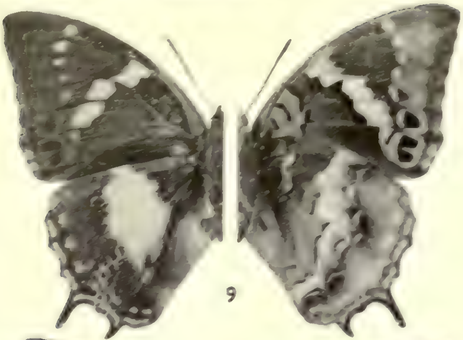
PLATE 2

Charaxes xiphares Cramer

FIG. 9, *penningtoni* van Son, f. *luminosa*, ♀ (Balgowan), upper and underside. FIG. 10, *penningtoni* van Son, ♀ (Balgowan), large hind wing patch, upper and underside. FIGS. 11 and 12, *penningtoni* van Son, ♂ (Eshowe and Balgowan, Natal), upper and underside. FIG. 13. *penningtoni* van Son, ♀ (Balgowan), extended post-discal spots on fore wing, upper and underside, FIG. 14, *penningtoni* van Son, ♀ (Durban), small hind wing patch, upper and underside. FIGS. 15 and 16, *draconis* Jordan, ♂ (Mariepskop), upper and underside.



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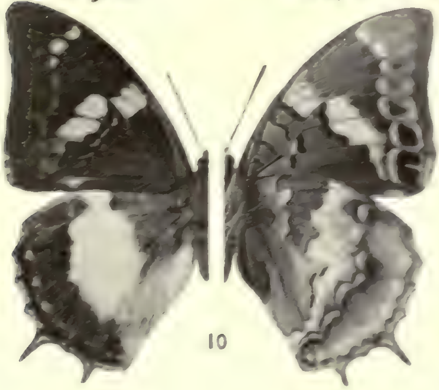

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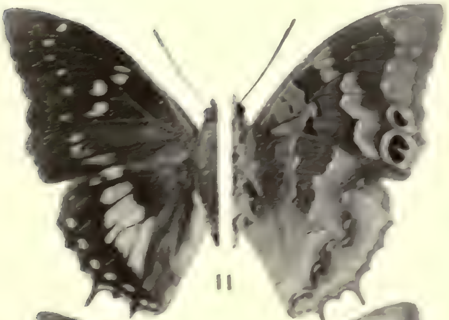

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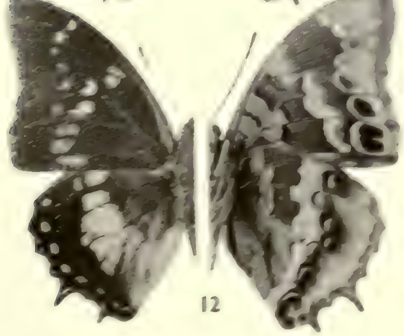

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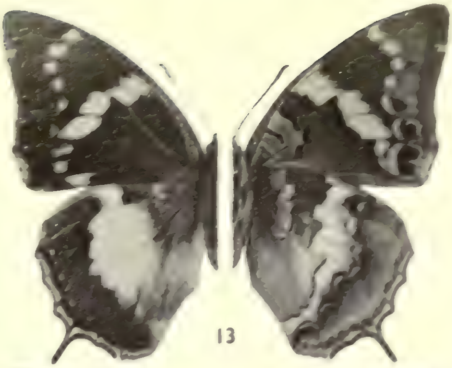

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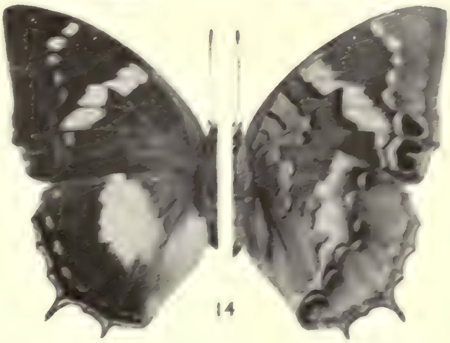

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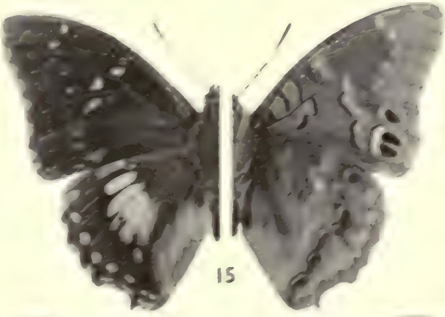

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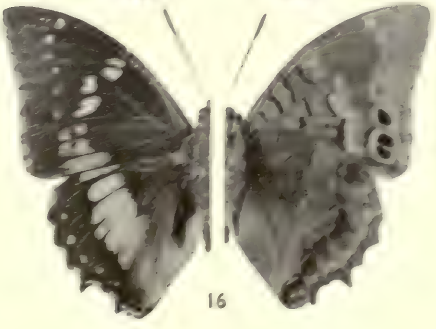

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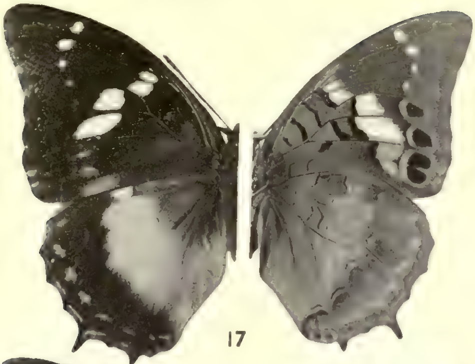
PLATE 3

Charaxes xiphares Cramer

Fig. 17, *draconis* Jordan, ♀, nominate form, upper and underside. Fig. 18, *draconis* Jordan, ♀ (Mariepskop), enlarged and extended discal spots on fore wing, upper and underside. Figs. 19 and 20, *bavenda* van Son, ♂ (Entabeni : Zoutspanberg), upper and underside. Fig. 21, *kenwayi* Poulton, ♂ (Haenertsburg), with large blue spots, upper and underside. Fig. 22, *kenwayi* Poulton, ♂ (Haenertsburg), with reduced blue areas, upper and underside. Fig. 23, *bavenda* van Son, ♀, nominate form, upper and underside. Fig. 24, *bavenda* f. *cyanescens* van Son, ♀, hind wing discal white suffused with lavender, upper and underside.



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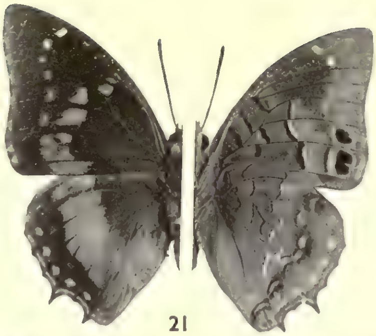

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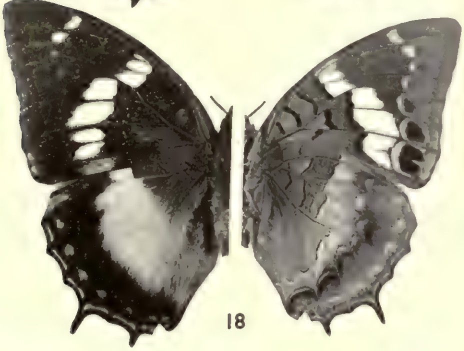

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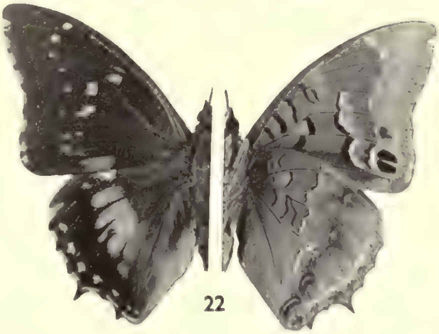

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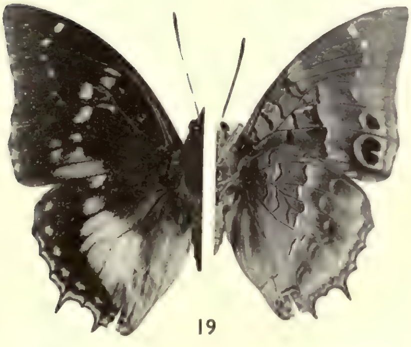

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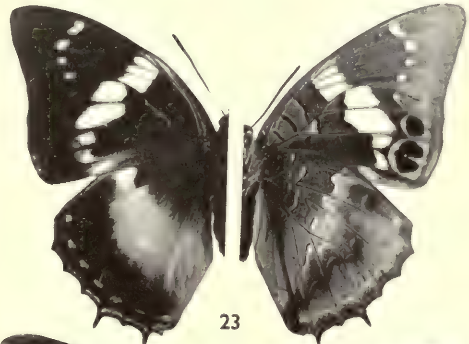

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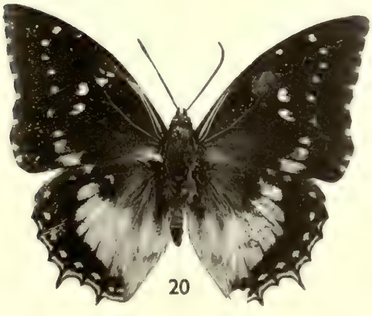

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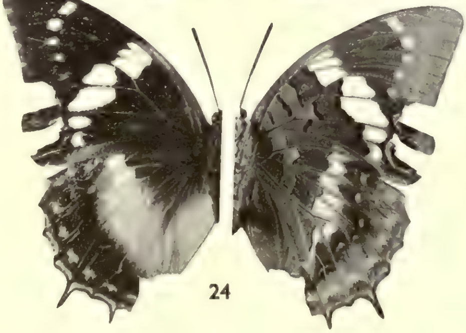

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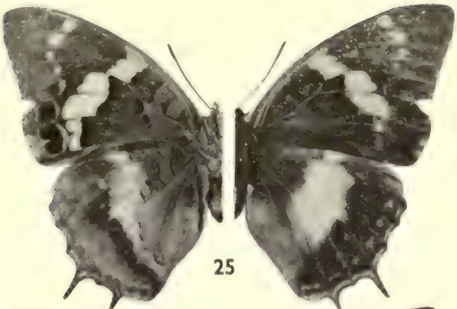
PLATE 4

Charaxes xiphares Cramer

FIG. 25, *kenwayi* Poulton, ♀, nominate form, hind wing discal patch white, upper and underside. FIG. 26, *kenwayi* Poulton, ♀, large form near *lutea* van Son, fore wing spots white, hind wing patch yellow ochre, upper and underside. FIG. 27, *kenwayi* Poulton, ♀ (Haenertsburg, Woodbush), form near *lutea* van Son but with fore wing discal spots pale ochre, upper and underside. FIG. 28, *burgessi* van Son, ♂ (Rugege Forest, N.W. Lake Tanganyika), figured by Rebel as *brevicaudatus*. FIGS. 29 and 30, *vumbui* van Son, ♂ ♂ (S. Rhodesia : Vumba Mts., Umtali), upper and undersides. FIGS. 31 and 32, *vumbui* van Son, ♀ ♀, fore wing discal spots white, hind wing patch white or white strongly suffused violet distally, upper and undersides.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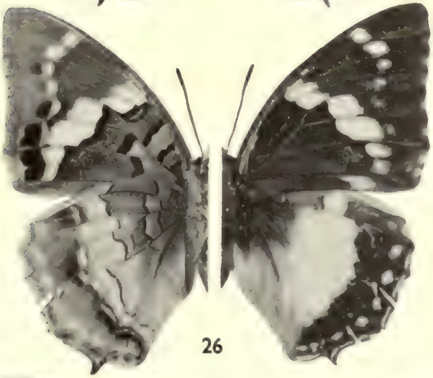
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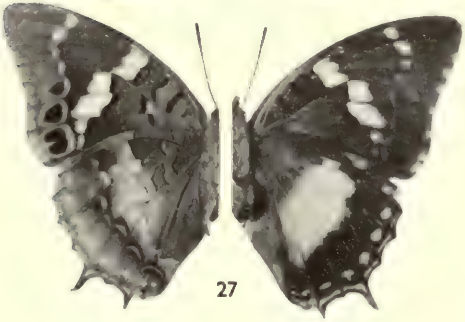
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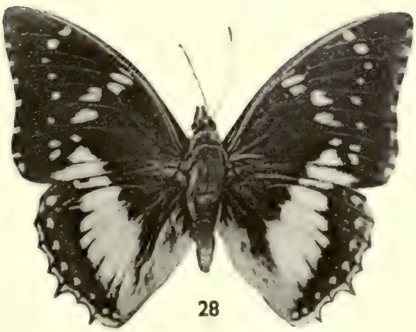
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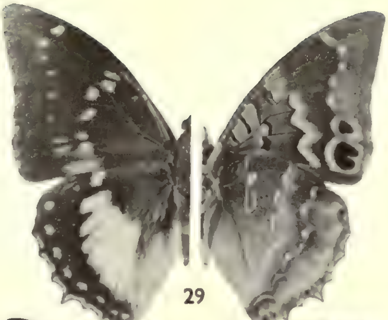
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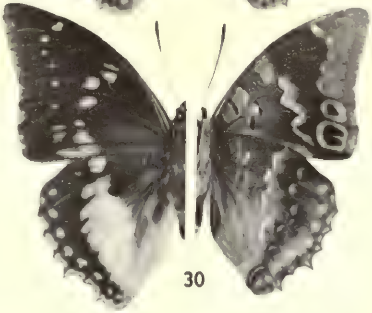
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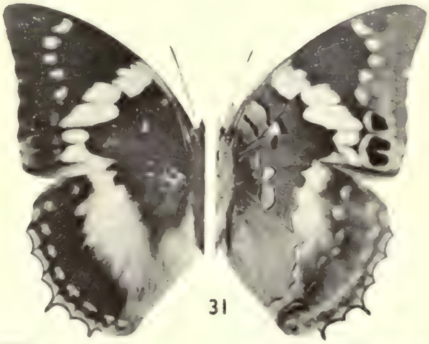
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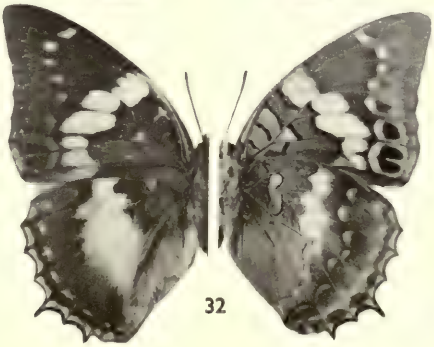
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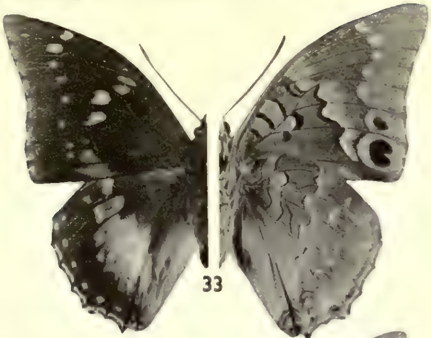
PLATE 5

Charaxes xiphares Cramer

FIG. 33, *brevicaudatus* Schultze, ♂ (topotypical Tanganyika : Manow, N. of L. Nyasa), upper and underside. FIG. 34, *brevicaudatus* Schultze, ♂ (Tanganyika : Iringa), British Museum (N.H.) Coll., upper and underside. FIG. 35, *woodi* ssp. n. Paratype ♂ (Nyasaland: Limbe), upper and underside. FIG. 36, *woodi* ssp. n. Type ♂ (Nyasaland : Cholo), upper and underside. FIG. 37, *brevicaudatus* Schultze, Type ♀ (Tanganyika), Berlin Museum, upper and underside. FIG. 38, *burgessi* van Son, Topotype ♀ (S.W. Uganda : Mafuga Forest, Kigesi ; Jackson), upper and underside. FIG. 39, *maudei* Joicey & Talbot, Type ♀ (Tanganyika, Lindi area, error?), B.M. (N.H.), ex Joicey Bequest, upper and underside. Photo B.M. (N.H.) Nos. 30321 & 30322.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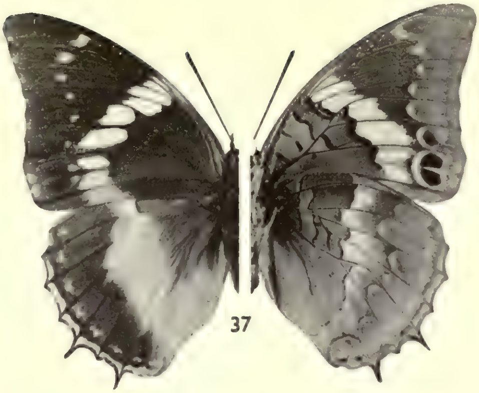
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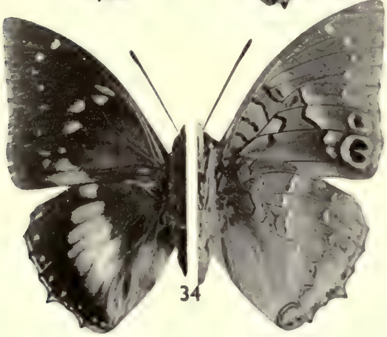
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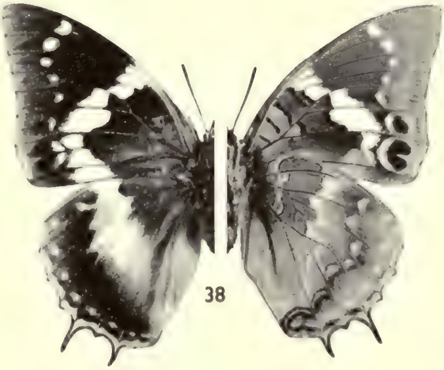
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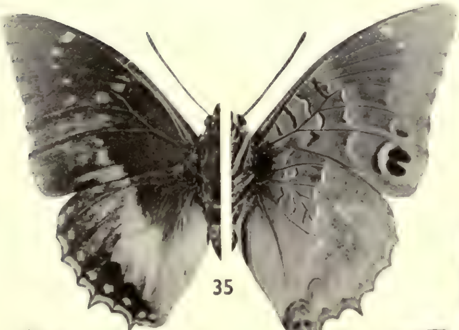
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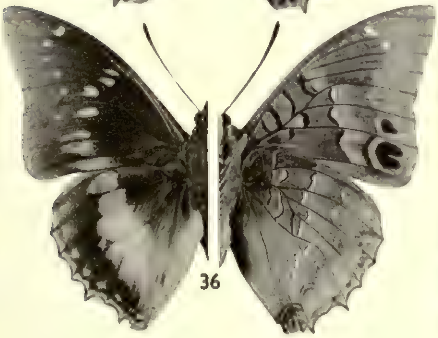
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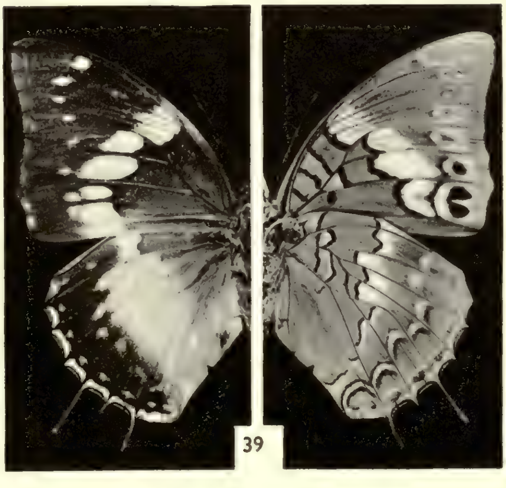
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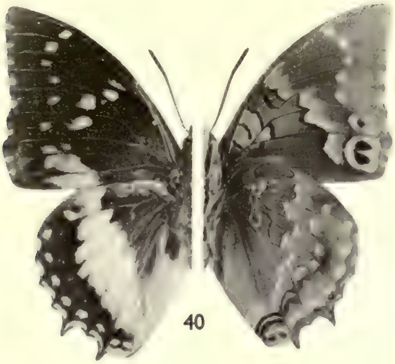
PLATE 6

Charaxes xiphares Cramer

FIG. 40, *burgessi* van Son, Paratype ♂ (S.W. Uganda : Mafuga Forest, Kigesi), upper and underside. FIG. 41, *burgessi* van Son, Topotype ♂ (S.W. Uganda : Mafuga Forest, Kigesi), upper and underside. FIGS. 42 and 45, ssp. ?, ♂ (Katanga : Kalule north ; Tributary Lualaba River), Mus. R. Congo, Tervuren, upper and underside. FIGS. 43 and 44, *maudei* Joicey & Talbot, ♂ ♂ (Tanganyika : Usambara Range, Magamba Forest, Loshoto), O'Brien and A. Rydon, Coryndon Museum, upper and undersides.



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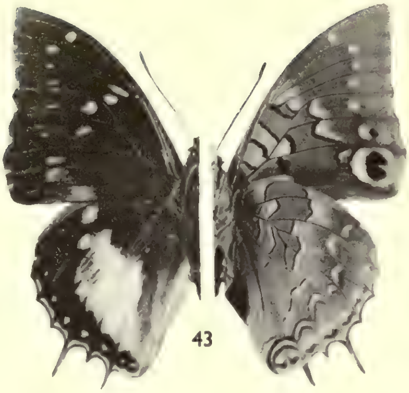

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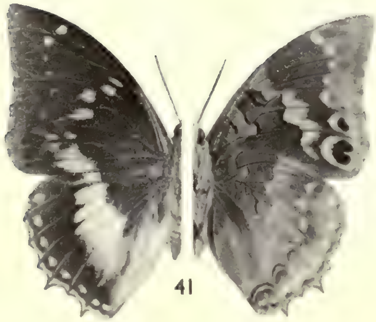

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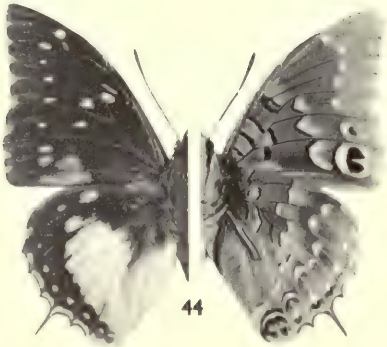

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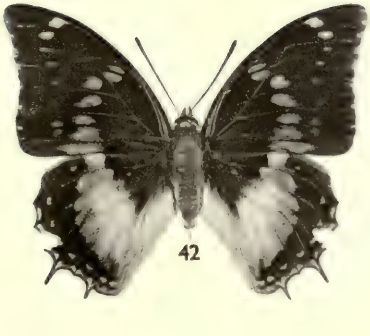

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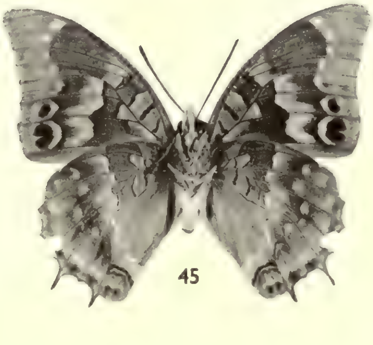

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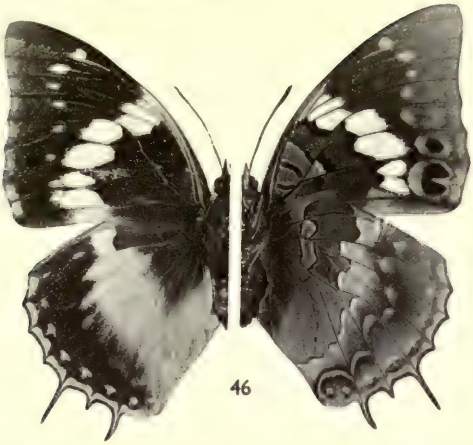
PLATE 7

Charaxes xiphares Cramer

FIGS. 46 and 47, *maudei* Joicey & Talbot, ♀ (Tanganyika : Usambara Range, Magamba Forest, Loshoto), A. Rydon, upper and underside. FIGS. 48 and 51, *wernickei* Joicey & Talbot, Type ♀, said to be from Cameroon, is suspect, probably from Eastern Transvaal ; repaired in hind wings, upper and underside. FIGS. 49 and 50, *kulal* van Someren, Topotype ♂ ♂ (Kenya, Northern Frontier, Mt. Kulal, E. Lake Rudolf), upper and undersides.



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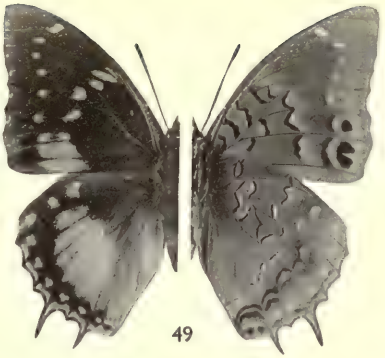

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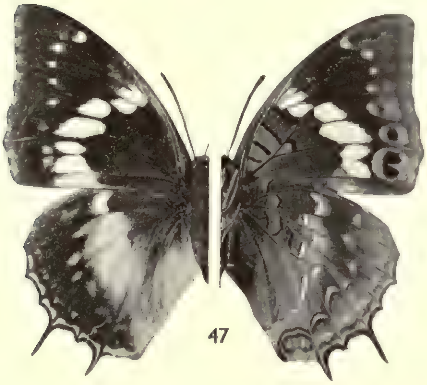

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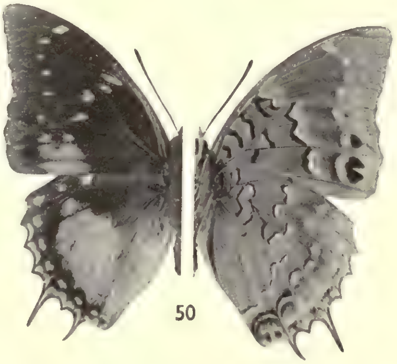

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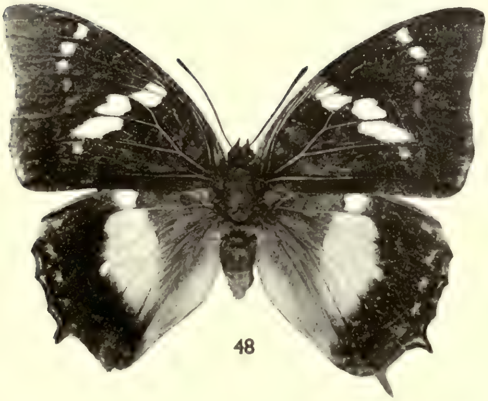

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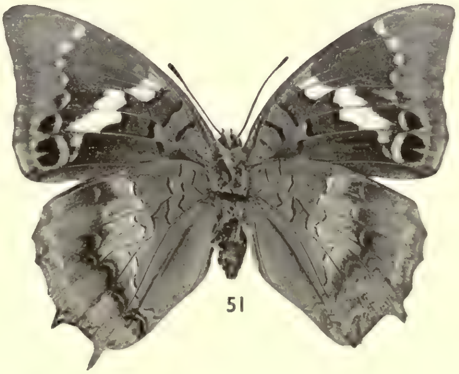

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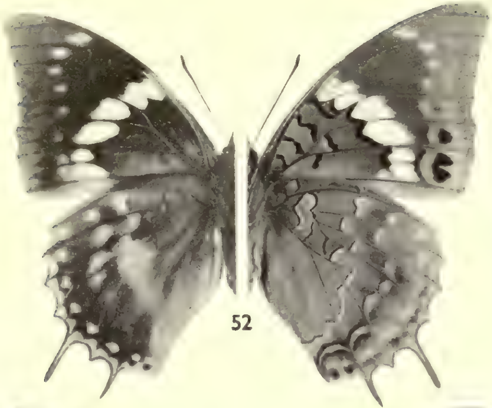
PLATE 8

Charaxes

FIGS. 52 and 53, *xiphares kulal* van Someren, comb. nov., Topotype ♀ ♀ (Kenya, Northern Frontier, Mt. Kulal, E. Lake Rudolf), upper and undersides. FIG. 54, *desmondi* van Someren, ♀, upper and underside. FIGS. 55 and 56, *desmondi* van Someren, Type ♂ (Teita Hills), in B.M. (N.H.), upper and underside. FIG. 57, *desmondi* van Someren, Paratype ♂ (Teita Hills), in coll. van Someren, upper and underside.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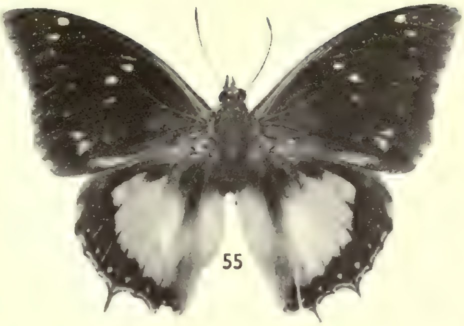
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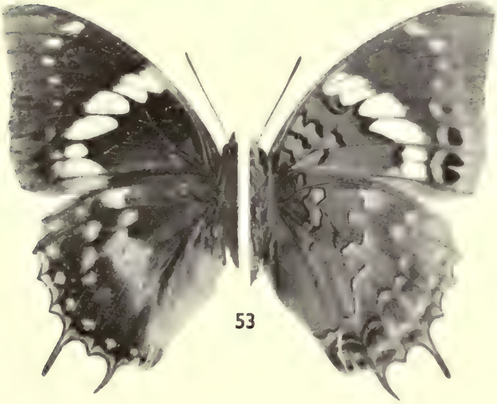
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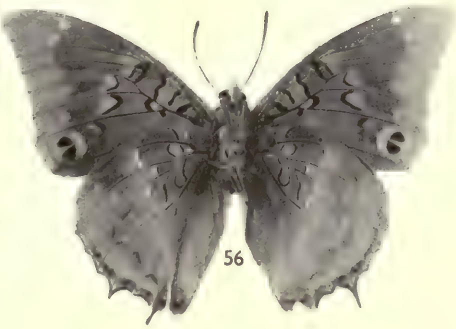
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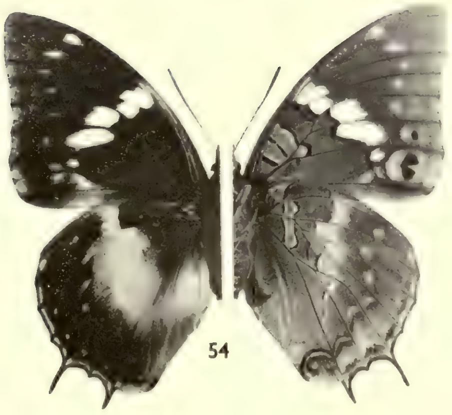
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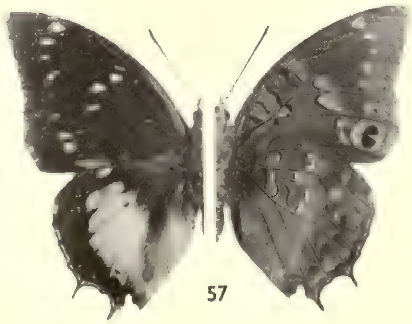
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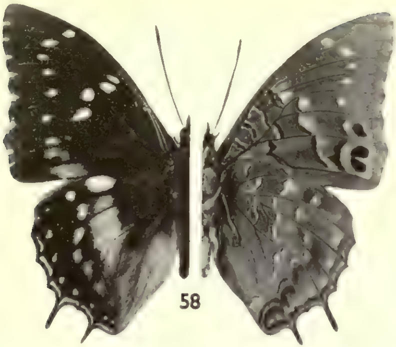
PLATE 9

Charaxes

FIGS. 58 and 59, *nandina* Rothschild & Jordan, ♂♂ (Kenya : Langata Forest, Ngong), upper and undersides. FIG. 60, *smaragdalis smaragdalis* Butler, f. *beni*, ♂ (N.E. Congo: Beni, Irumu), a large ecological form, upper and underside. FIGS. 61 and 62, *nandina* Rothschild & Jordan, ♀ (Kenya : Langata Forest, Ngong), upper and underside. FIG. 63, *smaragdalis smaragdalis* Butler, f. *beni*, ♀ (N.E. Congo : Beni, Irumu), a large ecological form with slightly narrower white bar in upper half of fore wing, upper and underside.



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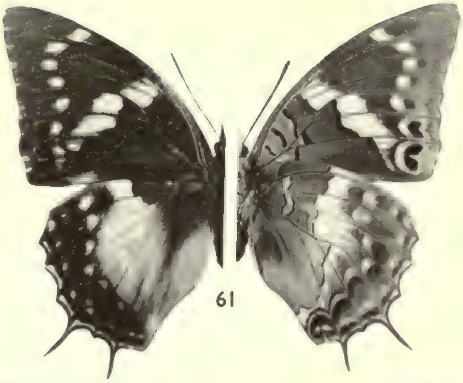

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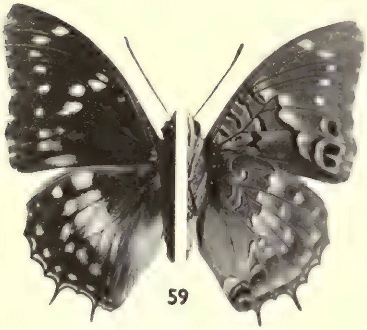

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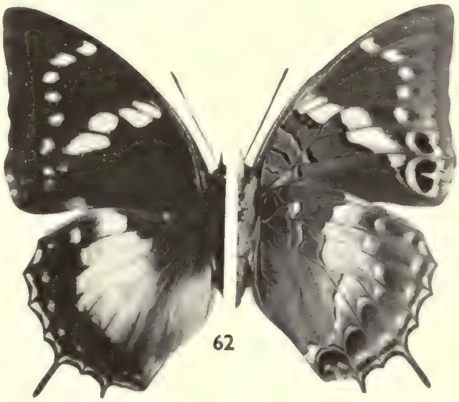

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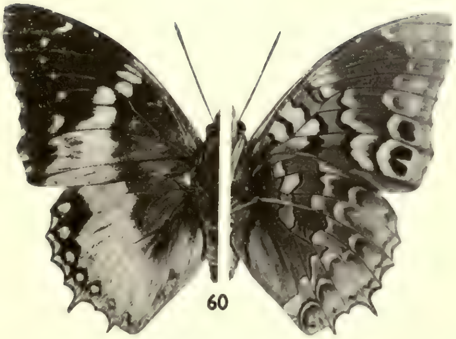

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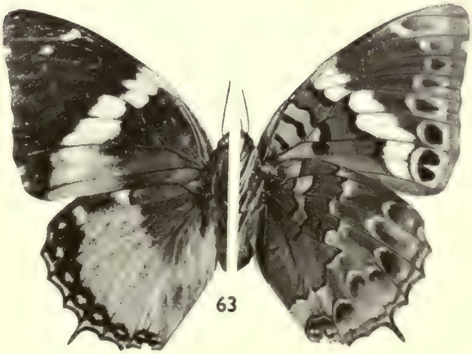
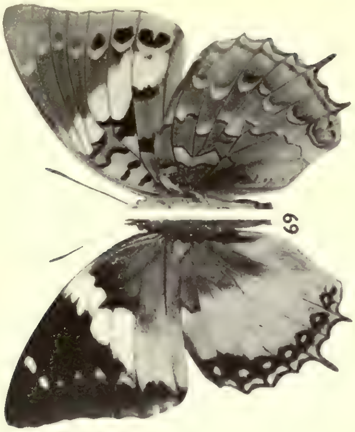


63

PLATE 10

Charaxes smaragdalis smaragdalis Butler

FIG. 64, ♂ (Upper Uelle), upper and underside. FIG. 65, ♂ (N.W. Congo : Ubangi), note variation in discal blue area in hind wing, upper and underside. FIG. 66, ♂ (French Congo : Coquihatville). FIG. 67, ♂ (Nigeria : Ikom). FIG. 68, ♂ (Cameroons : Lomi), a comparatively small race, c.f. f. *beni*, large blue area fore wing hind margin ; discal blue in hind wing extending to anal angle above tails ; note variations on undersides, upper and undersides. FIGS. 69 and 70, ♀ (French, Congo), very broad fore wing discal bar ; discal blue of hind wing extending to anal angle, upper and underside.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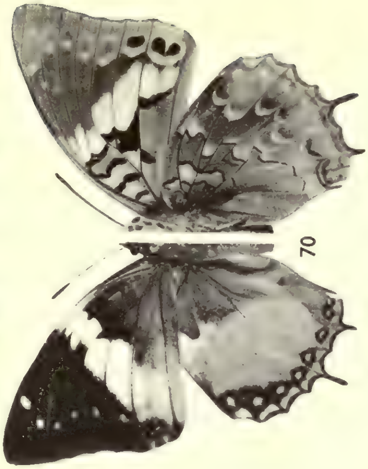
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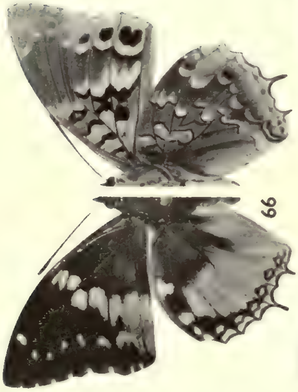
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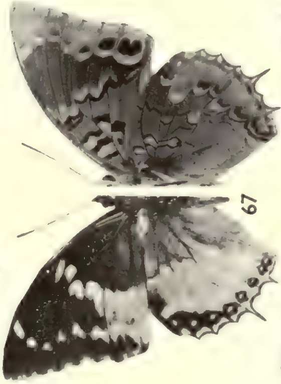
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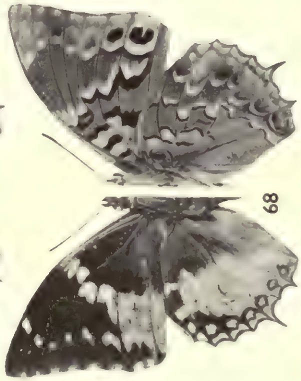
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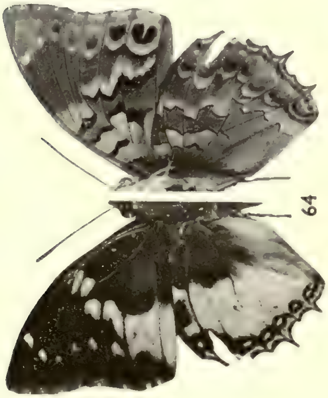
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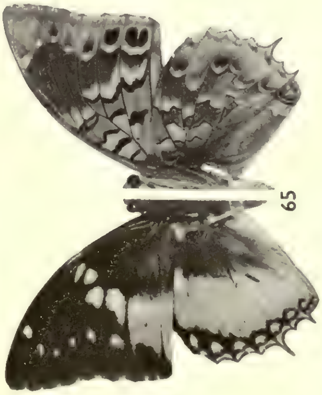
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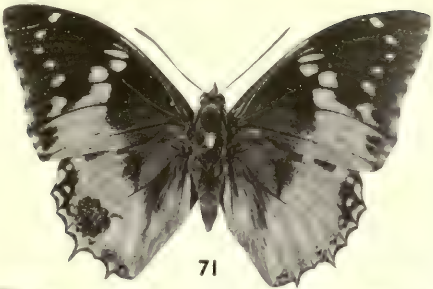
PLATE 11

Charaxes smaragdalis Butler

FIGS. 71 and 72, *smaragdalis* Butler, ♂ and ♀ (Kasai), ♂ with large blue area extending proximad ; discal blue extending to margin above upper tail. Hope Department, Oxford. FIGS. 73 and 74, *smaragdalis* Butler, ♂ and ♀ (Lulua), ♀ with hind wing discal blue restricted above tails ; black ringed spots contiguous, Mus. R. Congo, Tervuren. FIGS. 75 and 76, *smaragdalis* Butler, ♂ and ♀ (Sankuru), Mus. R. Congo, Tervuren. FIGS. 77 and 78, *butleri* Rothschild & Jordan, ♂ and ♀ (Sierra Leone), hind wing blue area bounded by wide black border.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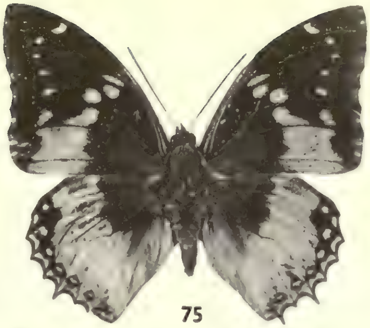
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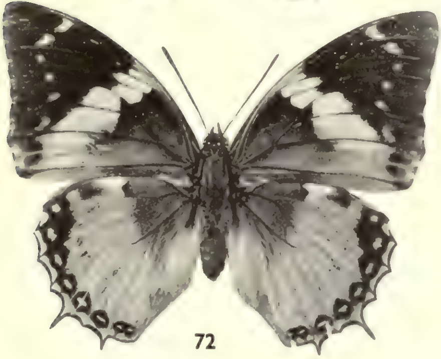
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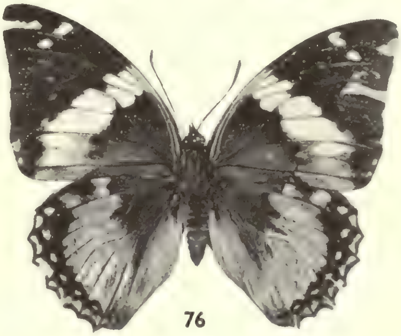
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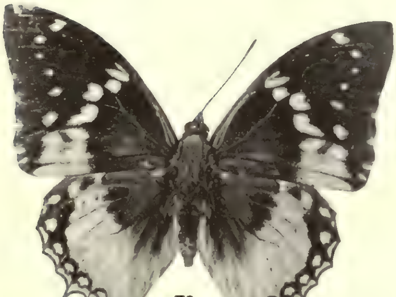
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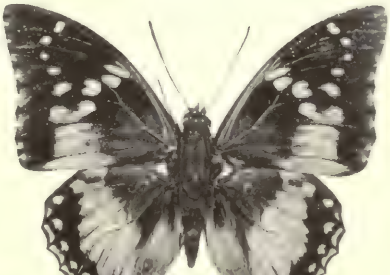
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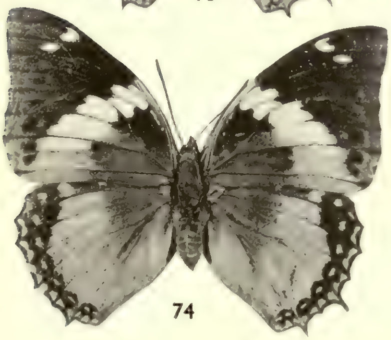
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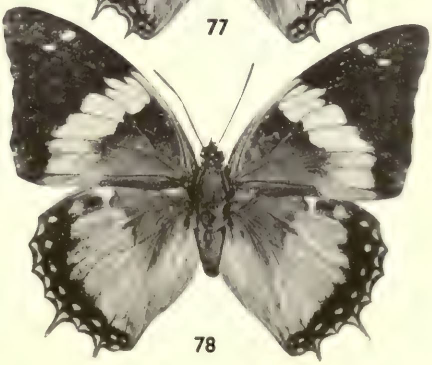
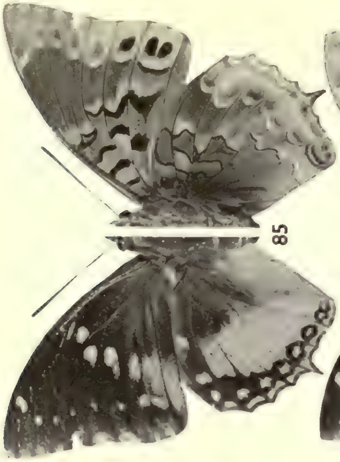

78

PLATE 12

Charaxes smaragdalis Butler

Fig. 79, *leopoldi* Ghesquière, form. reg., Type ♂ (Komi, Lodja). Figs. 80 and 81, *leopoldi* Ghesquière, Paratype ♂ (Leopoldsville, Sohal), upper and underside. Fig. 82, *leopoldi* Ghesquière, ♂ (Angola, Mechow), Berlin Museum. Fig. 83, *leopoldi* Ghesquière, ♀ var. (Leopoldville), fore wing discal bar composed of separate spots, c.f. *caerulea* (primitive ?). Fig. 84, *leopoldi* Ghesquière, ♀, fore discal bar wide ; hind wing black border wide. Figs. 85, 86 and 87, *caerulea* Carpenter & Jackson, ♂ ♂ (topotypical Kalimzu), fig. 85 shows an extra large specimen, upper and undersides.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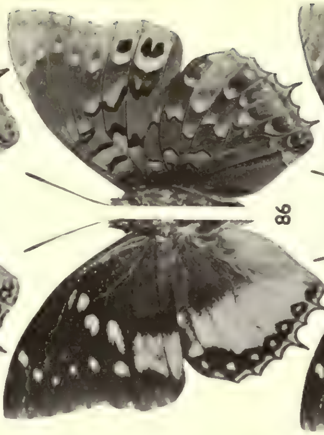
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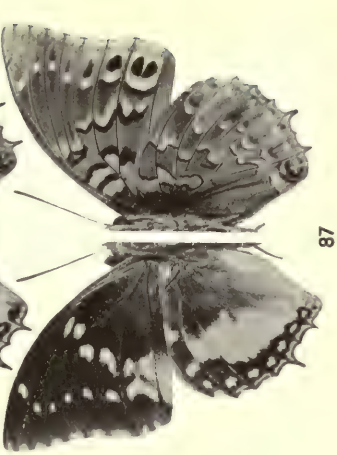
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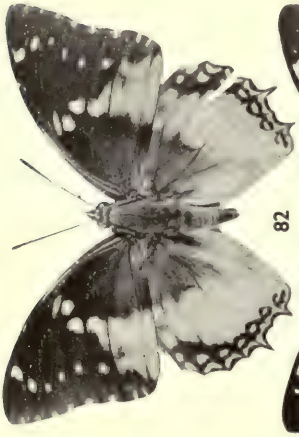
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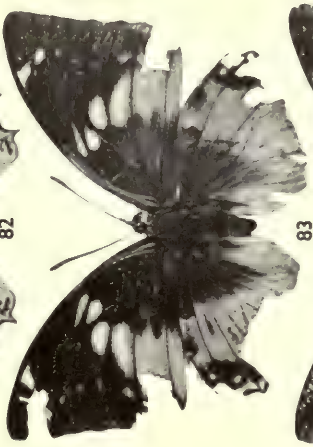
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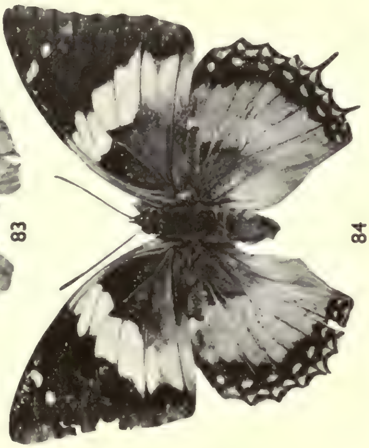
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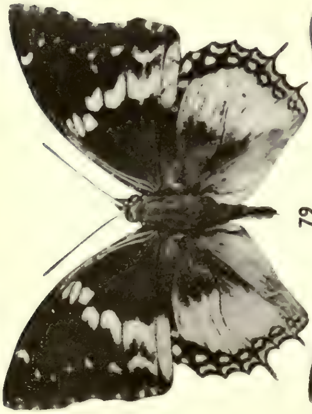
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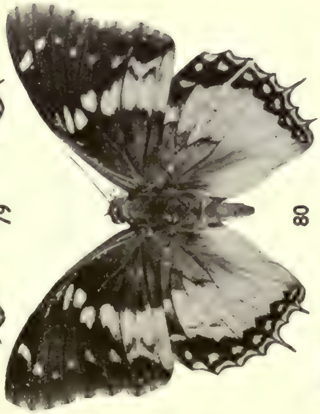
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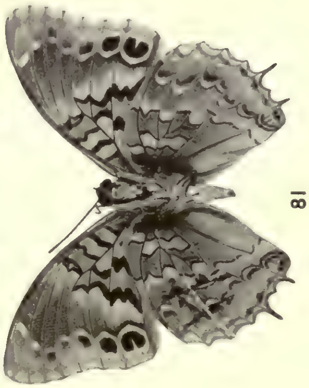
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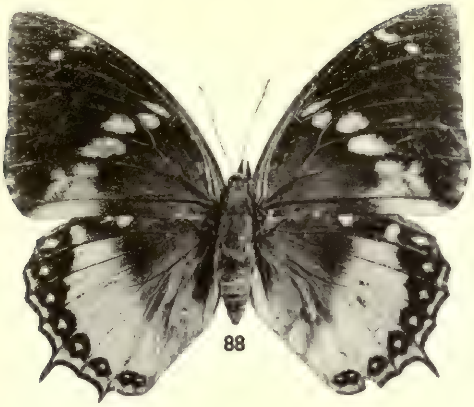
PLATE 13

Charaxes smaragdalis caerulea Carpenter & Jackson

Fig. 88, ♀ (topotypical ; Kalinzu). Fig. 89, ♀ (Uganda ; Kigezi, Kayonza), very reduced blue spots in fore wing above and below, upper and underside. Fig. 90, ♀ (Uganda : Kigezi, Kayonza), fore wing spots are white also on underside, upper and underside. Fig. 91, ♀ (topotypical ; Kalinzu). Fig. 92, ♀ (Uganda : Kigezi, Kayonza), fore wing spots purplish with ochre scaling distad, upper and underside. Fig. 93, ♀ (Uganda : Kigezi, Kayonza), fore wing spots purply-blue ; hind wing blue extends into anal angle ; a very large form in keeping with large ♂, upper and underside.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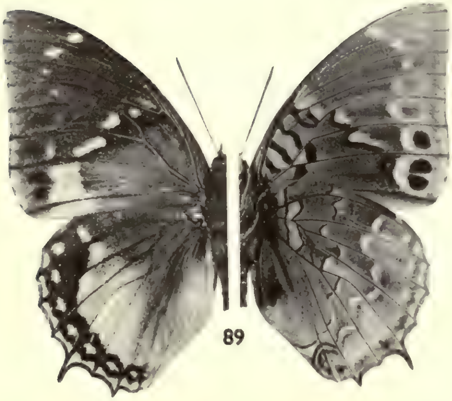
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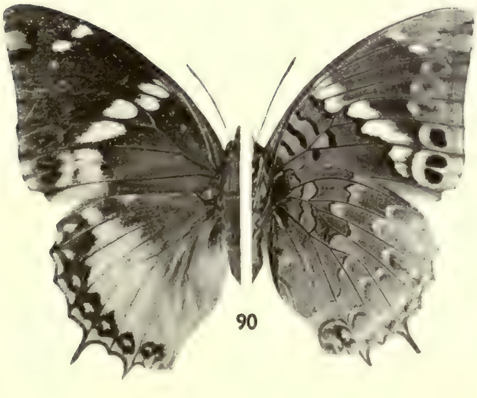
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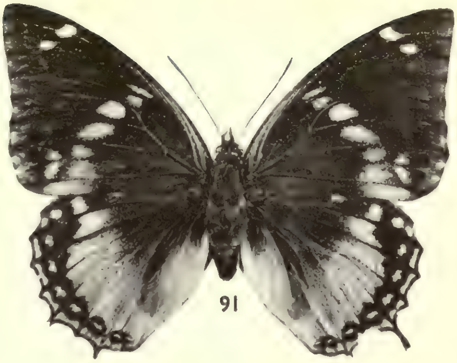
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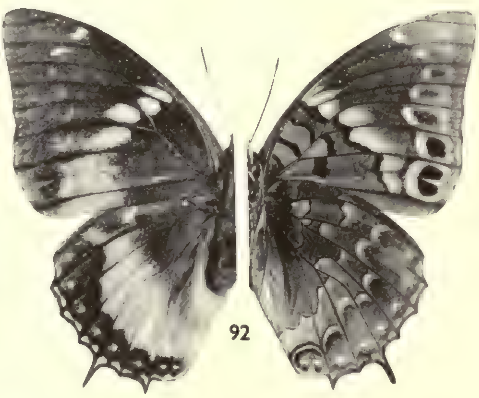
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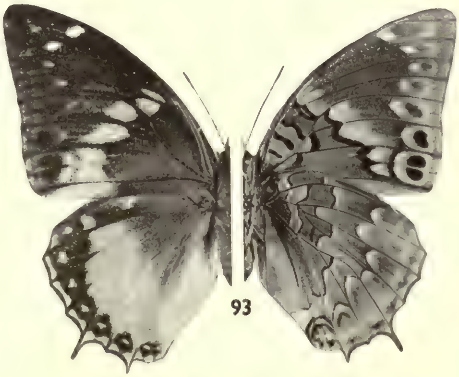
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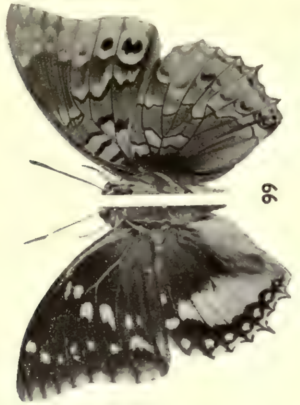
PLATE 14

Charaxes smaragdalis Butler

FIGS. 94, 95 and 96, *caerulea* Carpenter & Jackson, ♂ (Uganda : Kigezi, Kayonza), showing variation on upper and underside ; a large form, upper and underside. FIGS. 97 and 98, *caerulea* Carpenter & Jackson, ♂ (Lake Kivu area, Rutshuru), Vienna Museum, and (E. Congo : Kindu, Munyema), Mus. R. Congo Belge, Tervuren, respectively. FIGS. 99, 100 and 101, *toro* ssp. n., ♂ (West Uganda : Forests of Toro ; Kibali ; Mpanga ; Utwara), showing variations, a small very spotted race, upper and underside.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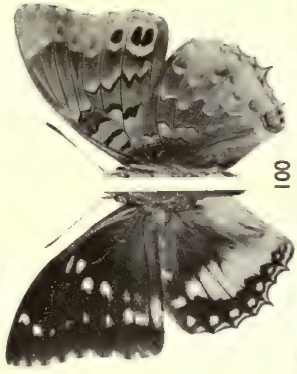
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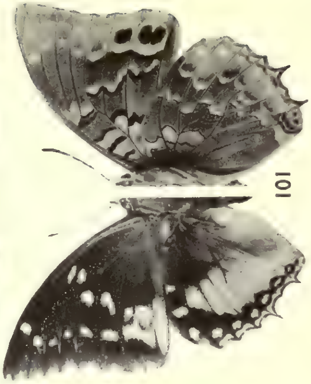
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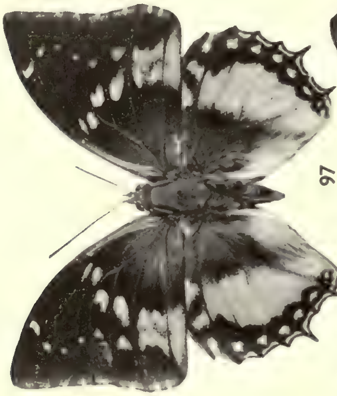
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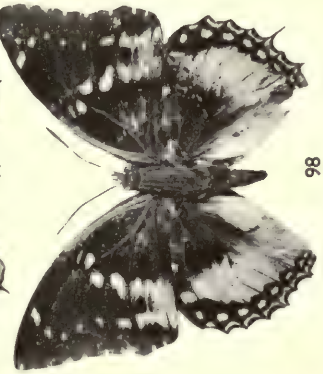
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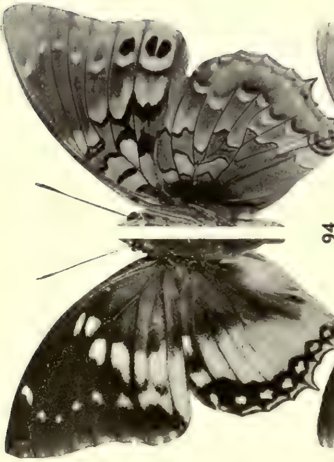
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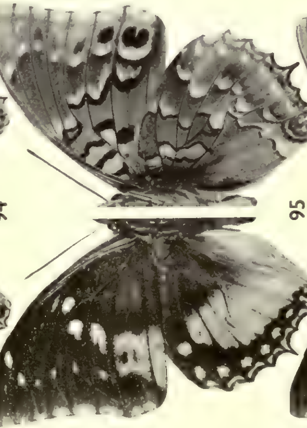
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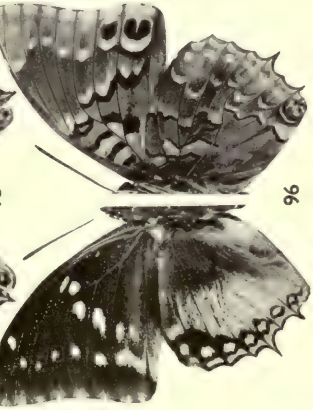
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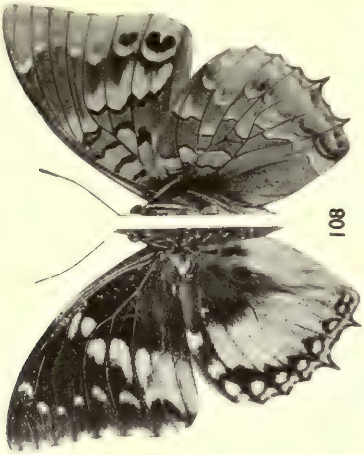
PLATE 15

Charaxes smaragdalis Butler

FIG. 102, *toro* ssp. n., ♀, purply spotted var., a large specimen, upper and underside. FIG. 103, *toro* ssp. n., ♀, with strong blue spots, upper and underside. FIG. 104, *toro* ssp. n., ♀, fore wing spots purply with some ochre scaling 1b, hind wing discal patch larger than usual, upper and underside. FIG. 105, transitional to *toro*, ♂ (Bugoma Forest), hind wing blue extending to anal angle. FIG. 106, transitional to *toro*, ♀ (Bugoma Forest), fore wing discal spots white with purply-blue scaling around. FIG. 107, transitional to *toro*, ♂ (N.E. Congo : Ituri, Kibali area, W. of Lake Albert), hind wing discal blue restricted, marginal black border wide, Mus. R. Congo Belge, Tervuren. FIGS. 108 and 109, ♂, near *elgonae* (N.W. Kenya : Forests of Kapwaren ; Kaimosi ; Kakamega ; Kabras. Uganda : Busoga District ; Buvuma Island).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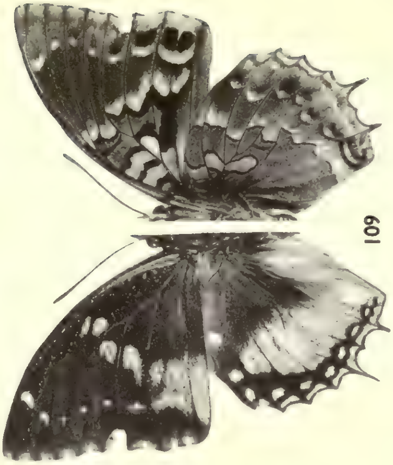
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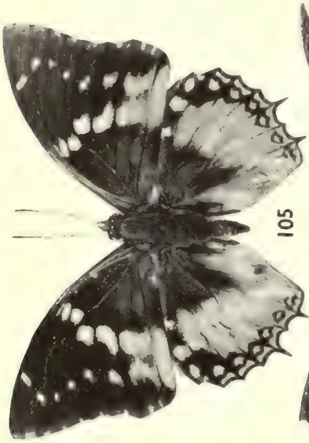
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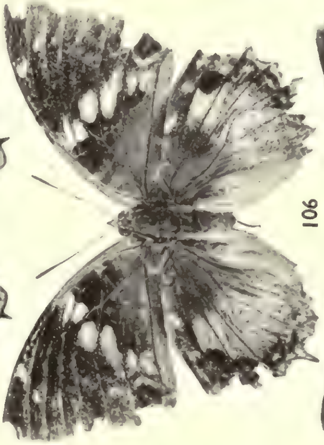
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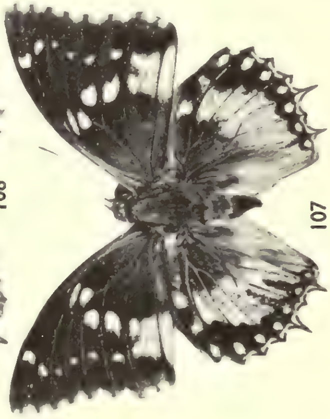
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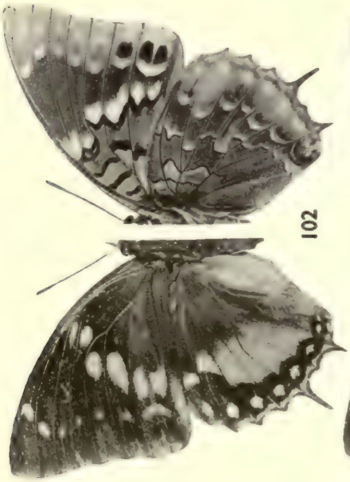
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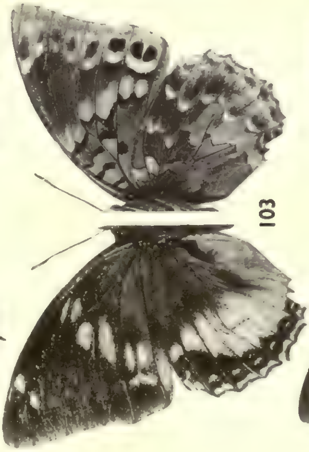
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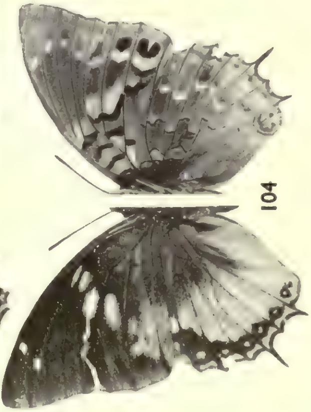
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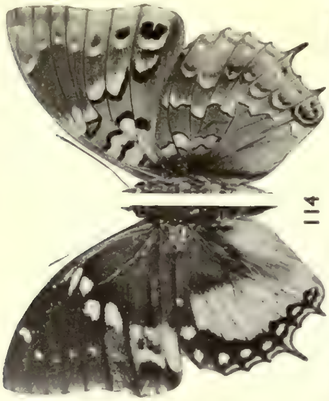
PLATE 16

Charaxes smaragdalis Butler

FIGS. 110, 111, 112 and 113, *elgonae* ssp. n., 2 ♂, 2 ♀ (Uganda : Mbale District, W. Mt. Elgon, Bufumbo Forest), ♂ a strongly marked race, ♀ with fore wing discal bar narrow, upper and undersides. FIGS. 114, 115 and 116, *homonymus* Bryk (*orientalis* Joicey & Talbot preoccupied), 3 ♂ (Kenya, the high forests of Kericho and Sotik), a relatively small race ; hind wing discal blue restricted ; black border well marked, upper and undersides.



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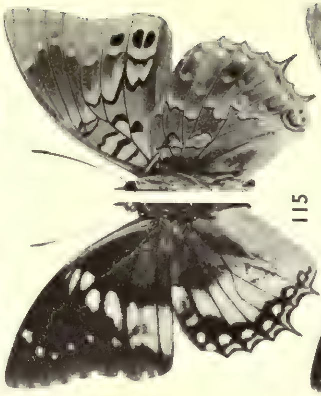

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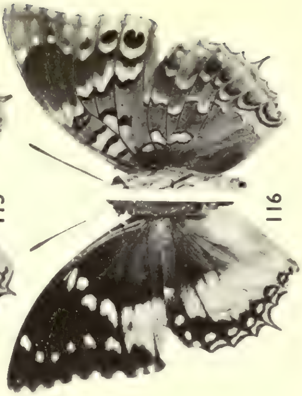

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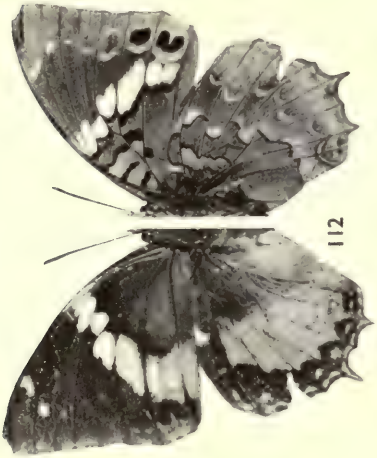

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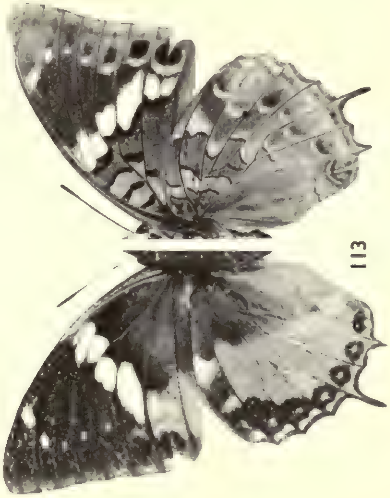

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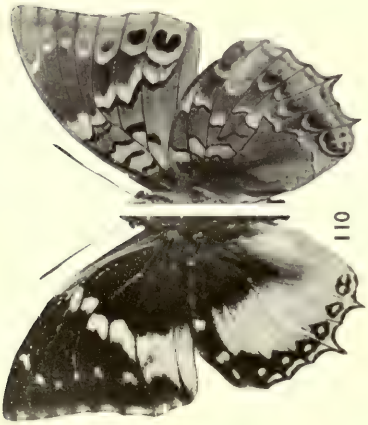

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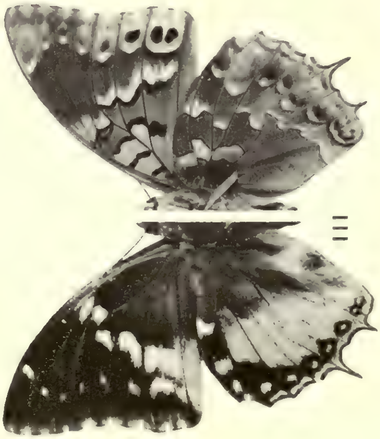
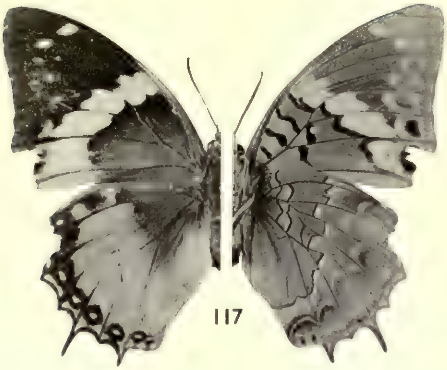


111

PLATE 17

Charaxes smaragdalis Butler

FIGS. 117, 118 and 119, *homonymus* Bryk (*orientalis* Joicey & Talbot preoccupied), 3 ♀ (Kenya, the high forests of Kericho and Sotik), a comparatively small race ; fore wing discal bar usually wider than elongate ; hind wing black border narrow but entire, upper and undersides. FIGS. 120, 121 and 122, *kagera* ssp. n., 3 ♂ (West shores of Lake Victoria, low forests of Kagera River and Katera, Sango Bay), showing variations, a larger race than *homonymus* ; hind wing black border well developed, upper and undersides.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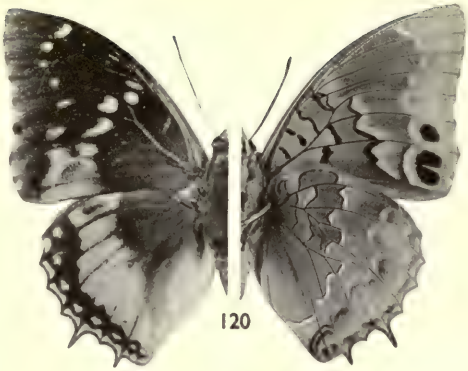
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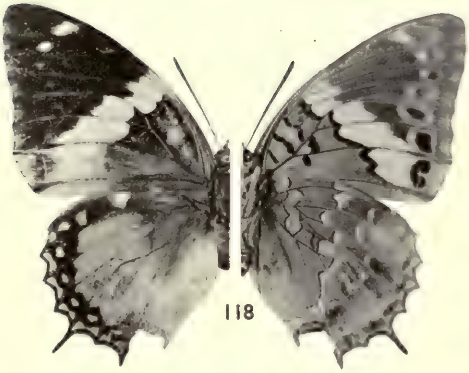
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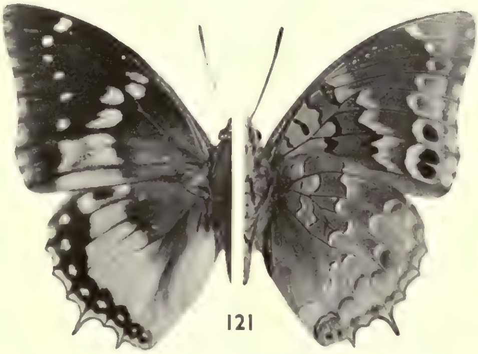
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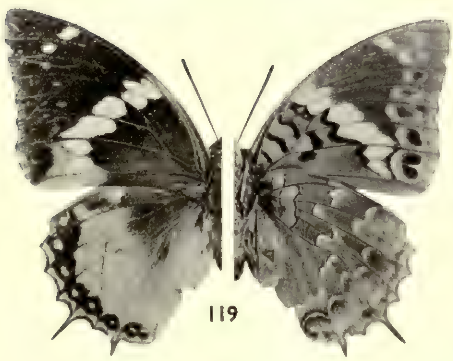
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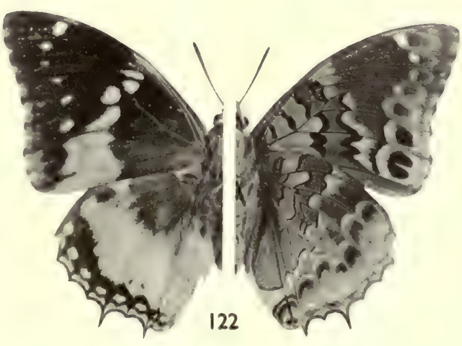
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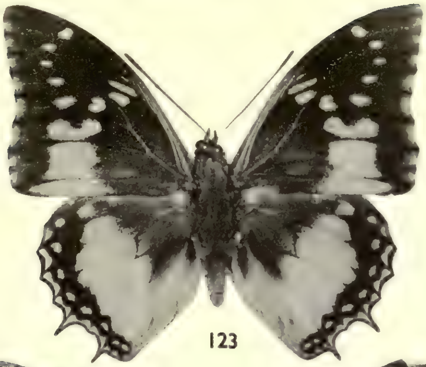
PLATE 18

Charaxes smaragdalis Butler

Figs. 123 and 124, *kagera* ssp. n., ♂ (? Bukoba area), ♀ (Tanganyika : Biharamulo District, Geita). Figs. 125 and 126, *metu* ssp. n., ♂ (Northern Uganda : West Nile District ; West Madi ; forested hills Metu District), a small race showing a trend toward the nominate ssp., upper and underside. Figs. 127 and 128, *kagera* ssp. n., ♀ (Tanganyika : Kakindu Hill, North bank of Kagera River), Type of ♀ *orientalis* Carpenter, Photo Hope Department, Oxford (figs. somewhat reduced), upper and underside. Figs, 129 and 130, *metu* ssp. n., ♀, a small race showing a trend toward the nominate ssp., ♀ with fore wing discal bar narrow, upper and underside.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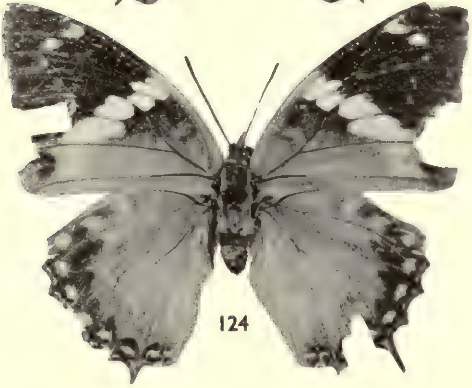
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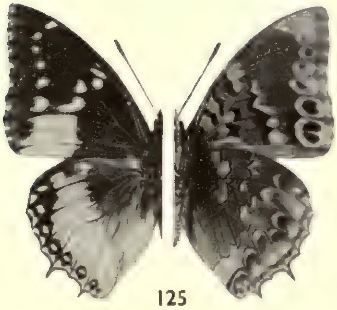
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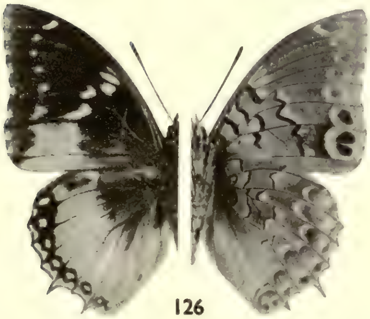
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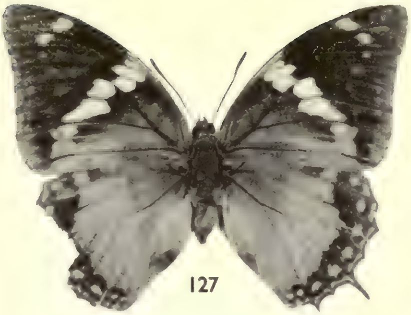
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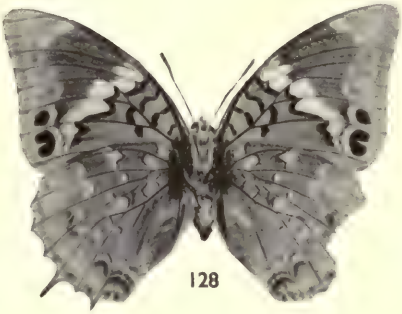
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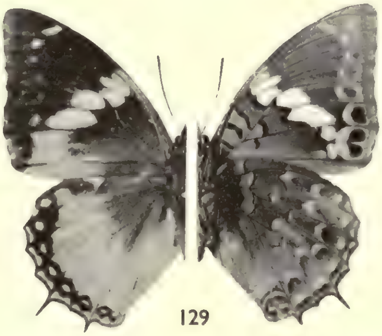
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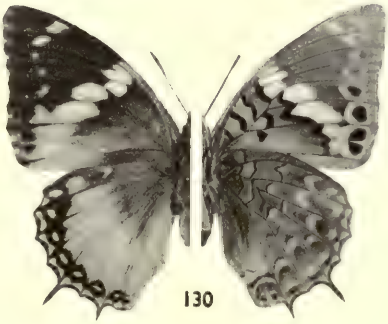
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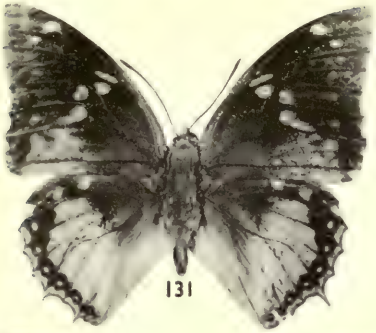
PLATE 19

Charaxes

FIGS. 131 and 132, ***smaragdalis kigoma*** ssp. n., ♂ (N.E. Lake Tanganyika : Kigoma District, Mukuvu Forest), showing variation. FIGS. 133 and 134, *cithaeron cithaeron* Felder, ♂ (Delagoa Bay) and ♂ (Natal), var. with reduced hind wing patch respectively, upper and undersides. FIG. 135, ***smaragdalis kigoma*** ssp. n., ♀ (N.E. Lake Tanganyika, Kigoma District, Mukuvu Forest). FIGS. 136 and 137, *cithaeron cithaeron* Felder, ♀ (Delagoa Bay and Natal respectively), upper and undersides.



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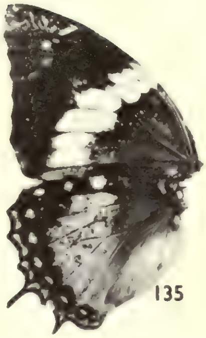

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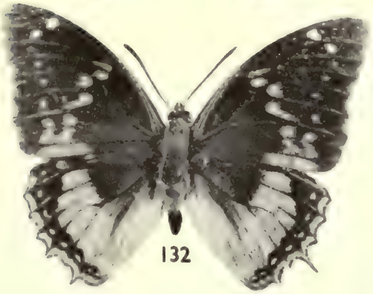

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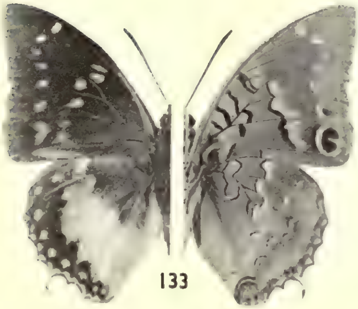

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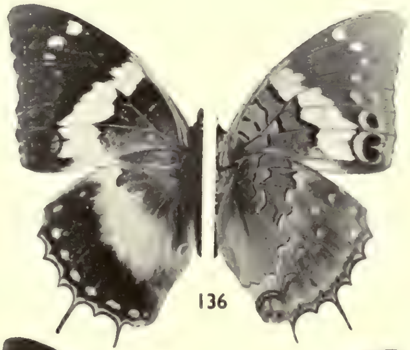

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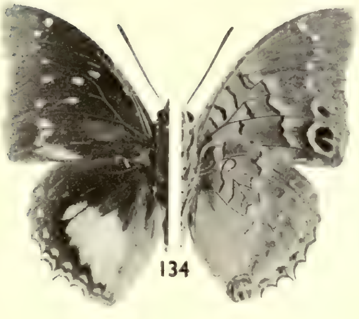

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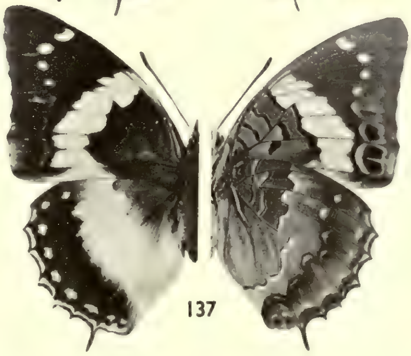

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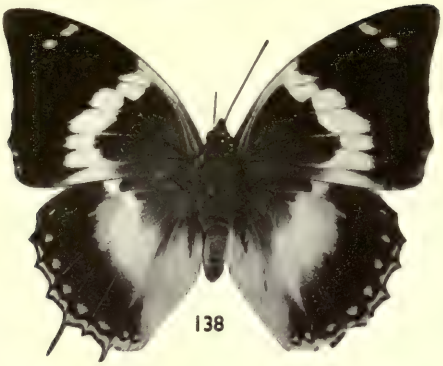
PLATE 20

Charaxes cithaeron Felder

FIGS. 138 and 139, *cithaeron* Felder, ♀ vars. (Swaziland : Natal, Port Shepstone). FIGS. 140 and 141, *joanae* ssp. n., ♂ and ♀, dry season forms showing suppression of pattern on underside, upper and undersides. FIGS. 142, 143, 144 and 145, *joanae* ssp. n., ♂ and Type ♂ ; Allotype ♀ and ♀ ; ♂ (Northern Rhodesia : Mumbwa, W. of Lusaka), specimen with slightly reduced hind wing patch and Type respectively ; ♀ Allotype and slight variant respectively, upper and undersides.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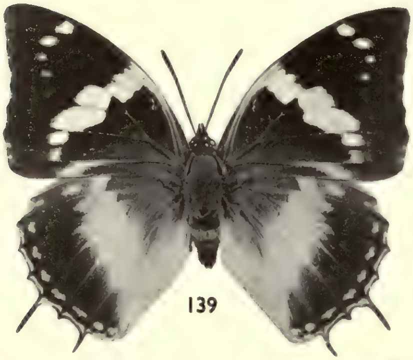
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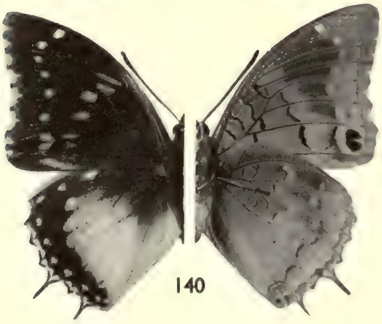
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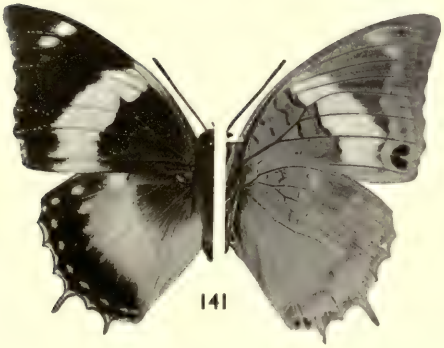
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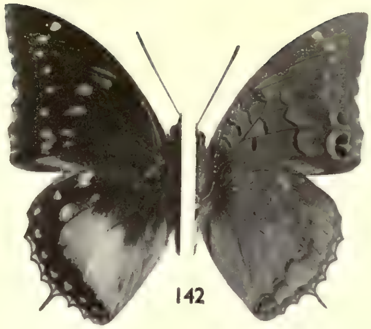
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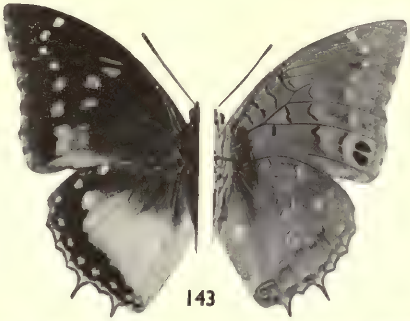
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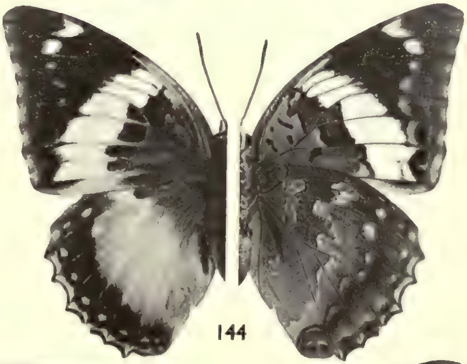
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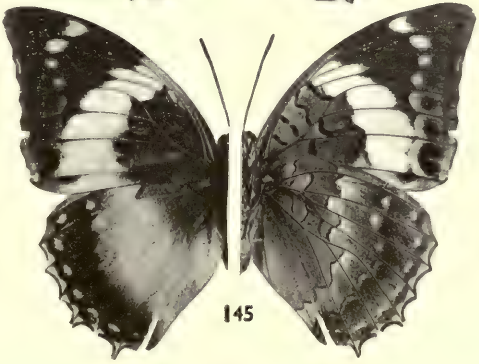
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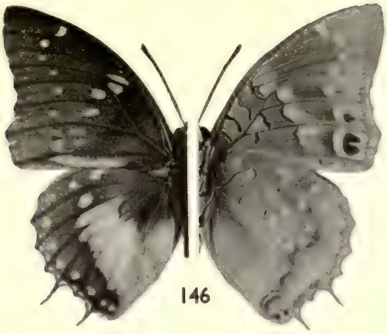
PLATE 21

Charaxes cithaeron Felder

FIG. 146, ab. *griseus* Schultze, Type ♂ (Tanganyika : Southern Highlands, Manow, North of Lake Nyasa), upper and underside. FIG. 147, *nyasae* ssp. n., Holotype ♂ (Nyasaland : Mlanje 2,500 ft., Mlosa stream), upper and underside. FIGS. 148 and 149, *nyasae* ssp. n., ♂ (Nyasaland), variants within the series, upper and undersides. FIGS. 150, 151 and 152, *nairobicus* van Son, 2 ♀ (topotypical Nairobi), and ♀ var. respectively, upper and undersides.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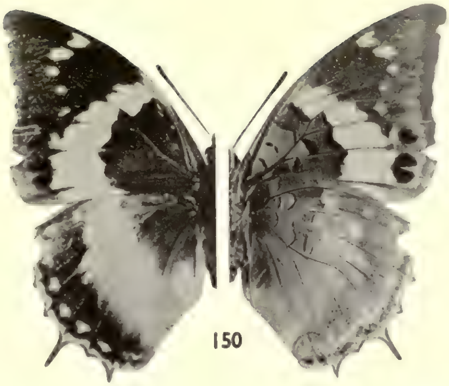
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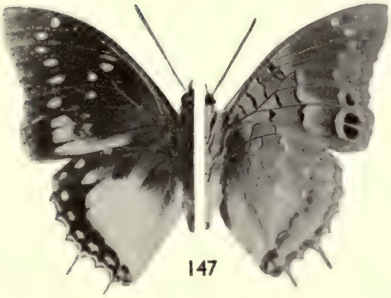
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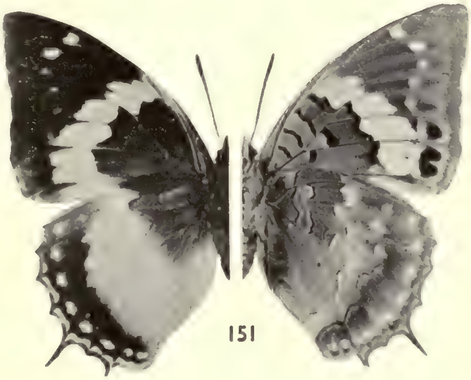
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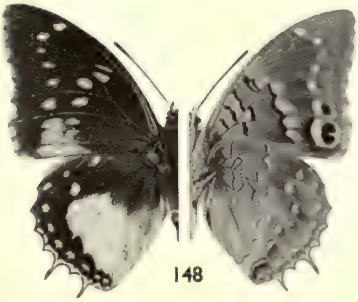
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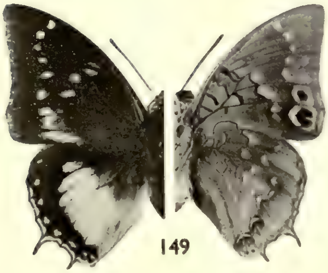
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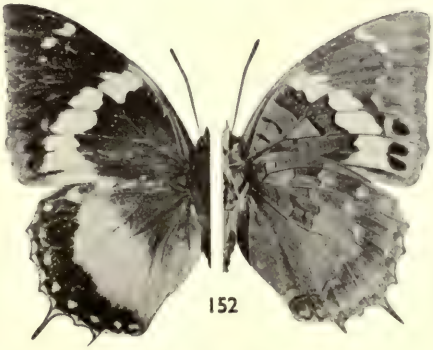
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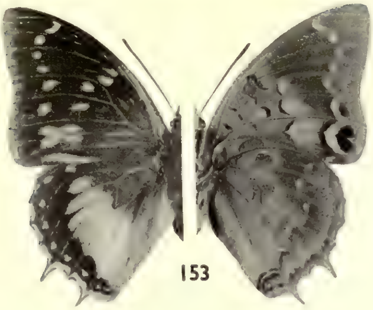
PLATE 22

Charaxes cithaeron Felder

FIGS. 153 and 154, *nyasae* ssp. n., ♂ (Mlanje, 2,000 ft.), extreme variants ; reduced hind wing patch ; diffuse pattern underside, upper and underside. FIGS. 155 and 156, *nyasae* ssp. n., ♀ (Mlanje foothills), extreme variants, upper and underside. FIGS. 157 and 158, *kennethi* Poulton, topotypical ♂, upper and underside. FIGS. 159 and 160, *nairobicus* van Son, ♂ (topotypical Nairobi), upper and underside.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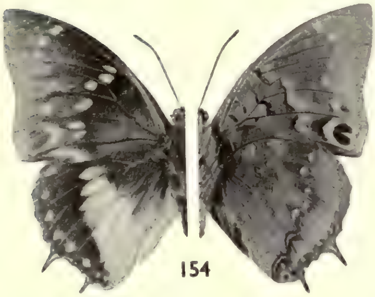
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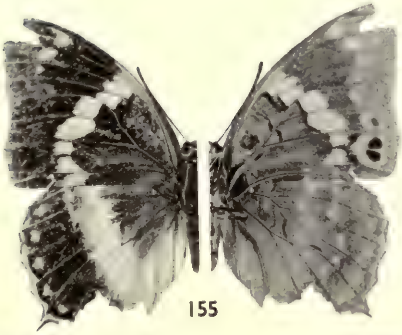
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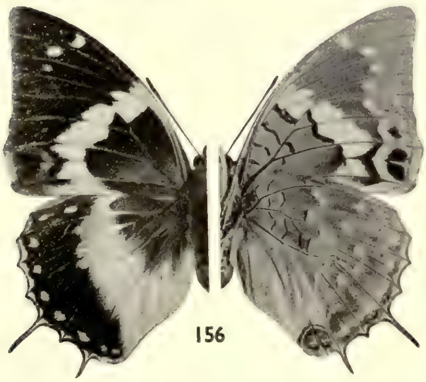
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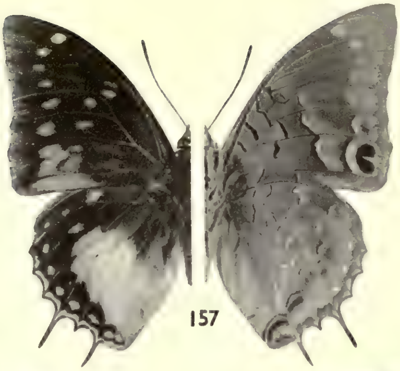
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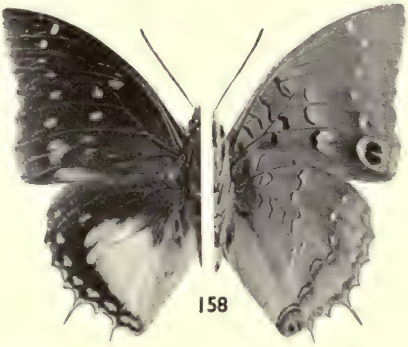
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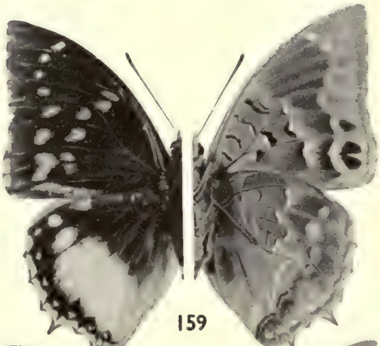
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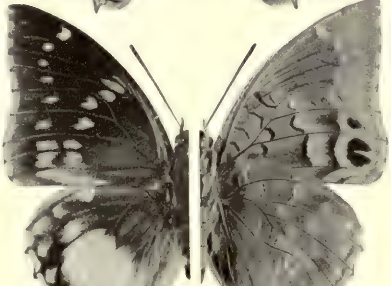
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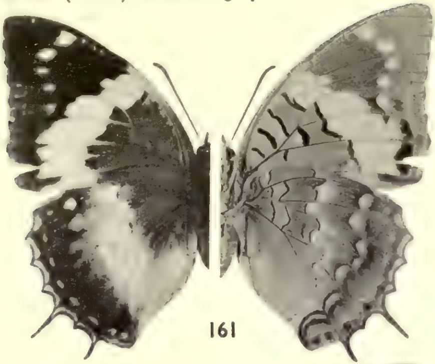
PLATE 23

Charaxes cithaeron Felder

FIGS. 161, 162 and 163, *nyasae* ssp. n., ♀ (Nkata Bay, Mlanje 2,000 ft.), 2 slight variants and Allotype respectively, upper and underside. FIG. 164, *kennethi* <*nyasae*, ♂ (Tanganyika : Southern District, Newala, North of Ruvuma River), this specimen bears a strong resemblance to fig. 149, Plate 21, upper and underside. FIGS. 165, 166 and 167, *kennethi* Poulton, 2 ♀ topotypical and 1 ♀ var. *milimani* respectively (Amboni Forest, North of Witu), upper and undersides. FIG. 168, *kennethi* <*nyasae*, ♀ (Tanganyika: Southern District, Newala, North of Ruvuma River), upper and underside.



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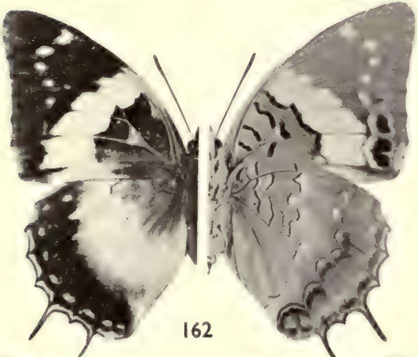

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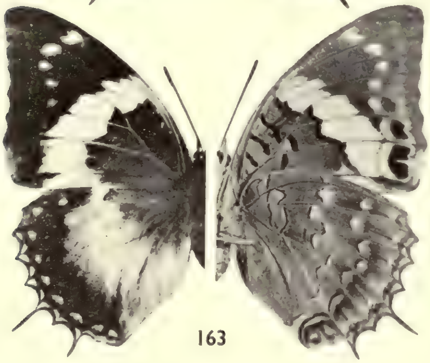

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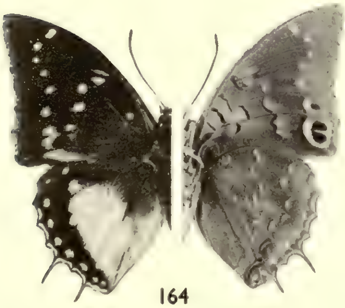

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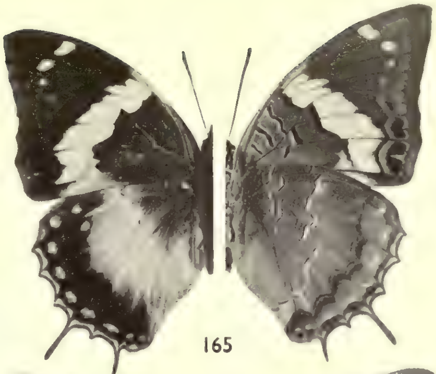

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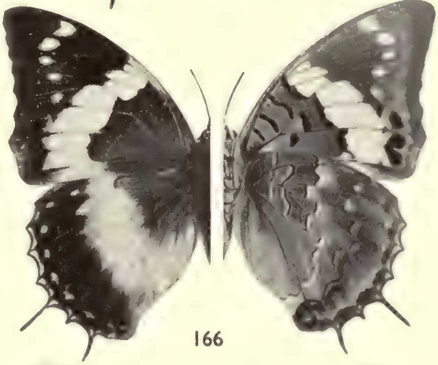

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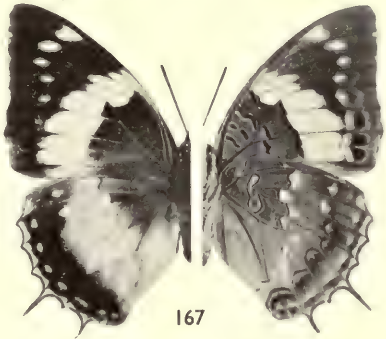

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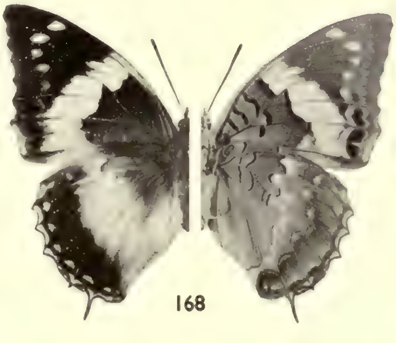

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DIPTERA FROM NEPAL

ASILIDAE

H. OLDROYD

SYRPHIDAE

R. L. COE

AND

SIMULIIDAE

D. J. LEWIS

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 15 No. 8
LONDON: 1964

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Pp. 237–294 ; 12 *Text-figures*

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THE BULLETIN OF THE BRITISH MUSEUM (NATURAL HISTORY), *instituted in* 1949, *is issued in five series corresponding to the Departments of the Museum, and an Historical series.*

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This paper is Vol. 15, *No.* 8 *of the Entomological series. The abbreviated titles of periodicals cited follow those of the World List of Scientific Periodicals.*

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DIPTERA FROM NEPAL

ASILIDAE

By H. OLDROYD

SYNOPSIS

Of the eight species in the collection six are described as new. The genus *Cophinopoda* Hull, 1958, is revised and six species are distinguished by differences in the male and female terminalia. Three of the six are described as new, and the geographical distribution of the various species is discussed.

As entomologist with the British Museum Expedition to Eastern Nepal in 1961–62, Mr. R. L. Coe brought back a small, but interesting collection of Asilidae. There are 37 specimens, belonging to eight species, each from a different genus. Only two of these can be identified with known species, and these with some degree of doubt.

The Asilidae of India have recently been catalogued by Rattan Lal (1960). This is an excellent summary of previous work, and makes it possible for the first time to describe new species of Asilidae from India with some degree of confidence. There are some omissions from the Catalogue ; a paper of my own, describing three new species of *Stichopogon* from Southern India, published in 1948, is overlooked. Nevertheless the Catalogue is a valuable starting-point for future workers who will find a great many new species of Asilidae to describe from India.

In so far as this collection shows any marked zoogeographical affinities they are with the Palaearctic Region. Five of the eight genera concerned—*Cyrtopogon*, *Machimus*, *Neomochtherus*, *Heteropogon* and *Philonicus*—are essentially genera of temperate climates, though a few tropical species are known. *Oldroydia* appears to be a Himalayan derivative of *Cyrtopogon*. *Neolaparus* is a genus of the Old World tropics, best known in Africa. *Cophinopoda* has a most interesting distribution, which is discussed in detail in the present paper.

***Oldroydia maculata* sp. n.**

(Text-figs. 1, 2, 5)

The genus *Oldroydia* was erected by Professor F. M. Hull for some specimens in the British Museum that I had set apart from *Cyrtopogon* on account of the maned or crested thorax, and of a large projection from the fore femur which appeared as a secondary sexual character of the male. The antennae of the type species, *O. hamata* Hull, 1956 have the third segment elongate, and terminated by a spatulate or disciform plate with a small spine (Text-fig. 4). This and the thoracic mane are common to both sexes.

In Mr. Coe's material is a second species, distinguished at once from *hamata* in the male by having a conspicuous black spot at the extreme tip of the wing : a shadow appears in the same spot in the female, but is not obvious to the naked eye

(Text-fig. 1). In both sexes of the new species the antennae have no spatulate tip, ending in a pointed style. In other respects the general colouring is almost identical with that of *hamata*.

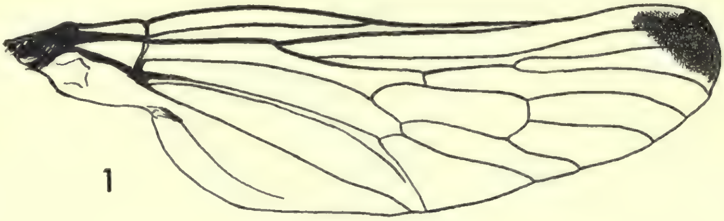
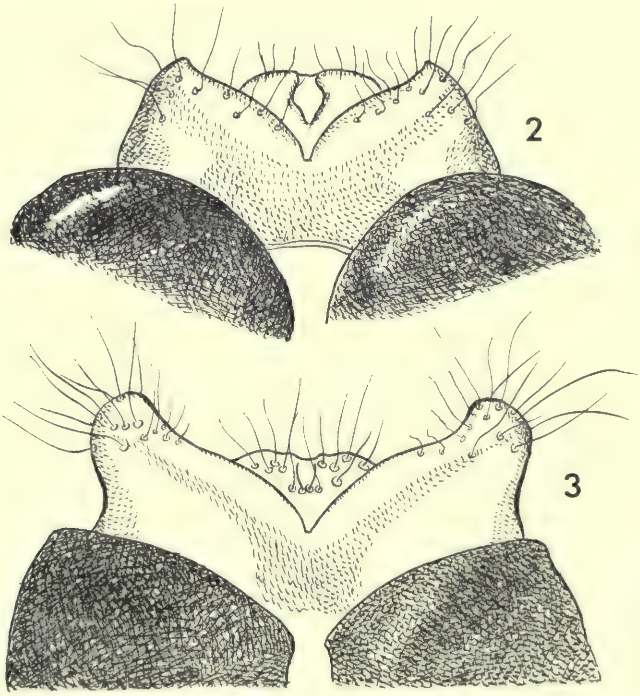


FIG. 1. Wing of *Oldroydia maculata*, sp. n.

MALE. *Head :* facial knob large, smoothly convex from mouth-margin to bases of antennae ; with thick grey tomentum, and a moustache consisting of very fine, silky black hairs, as long as height of head, and longer than antennae. Frons with grey tomentum and long, fine, erect black hairs, very long ones arising from ocellar tubercle. Occipital hairs very long, fine, silky black, with no strong bristles. Beard mostly black. Palpi black with black hairs. Antennae black with fine black hairs ; first two segments about equal in length ; third segment narrow and awl-like, half as long again as two basal segments together ; style 3-segmented, pointed, about as long as first segment (Text-fig. 5).



FIGS. 2, 3. Ninth tergite and terminal lamellae of males of *Oldroydia maculata* (2) and *O. hamata* (3).

Thorax. Pronotal collar of hairs soft, brownish. Mesonotum black, with a brown pattern that is partly shining. A broad, dark brown, median stripe bears on its middle third a crest or mane of erect black hairs almost as long as the antennae ; on each side of this brown stripe is a well-marked yellow stripe. Hairs over rest of mesonotum equally long, but sparser, except on scutellum where they are dense, very long and erect, and partly yellowish. Pleura blackish brown, brown hairs on propleuron and a tuft of long, brown hairs on metapleuron ; otherwise hairs black.

Abdomen. Laterally compressed as in *hamata.* Shining black, with dense, erect hairs. Dorsally a narrow black stripe. Remainder of first four tergites, and middle of fifth, with long yellowish hairs. Sides of fifth and entire tergites posterior to this with short, crisp, orange hairs. Venter of abdomen with black hairs, of the same length as those on corresponding tergites. Genitalia black with long black hairs ; Text-fig. 2 shows the structure, and the differences from *hamata* (Text-fig. 3).

Legs. Fore leg armed as in *hamata,* but with greater elaboration ; basal process longer ; apex of femur produced dorsally into a finger-like tip ; apex of tibia enlarged ; four tarsal segments also enlarged at tip. Other legs normal in shape. All femora black, tibiae red with black apex, tarsi black. Hairs and bristles a mixture of black and red, not nearly concolorous with ground colour as in *hamata.* Coxae with black hairs.

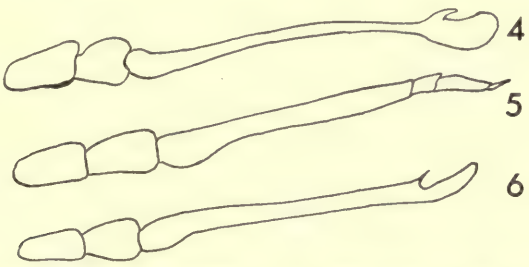
Wings (Text-fig. 1). As in *hamata.* The vein *Sc* is short, ending level with extreme base of discal cell. Thereafter vein R_1 runs very close to and parallel with costa. Wing is broad across basal half, but constricted apically. All cells open to margin, including anal cell. Much of membrane is smoky brown and at extreme tip a very clearly defined black spot. Halteres brownish.

Length of body 18 mm.; of wing 10 mm.

Female similar to male except in following respects :—Legs normal without any of the special structures of the male. Hairs of coxae and femora paler. Abdomen shiny with long, erect, pale hairs, and each segment with an interrupted posterior band of whitish tomentum. A trace of median stripe of black hairs can be detected, but is not conspicuous. Wings with vein *Sc* slightly longer than in male and apical half of wing less obviously constricted. Wing almost uniformly smoky, with a faint grey cloud at extreme tip, but no obvious spot.

Holotype ♂, 4 ♂, 2 ♀ paratypes : NEPAL : Taplejung Dt., damp evergreen forest above Sangu, c. 8,500 ft., 2–26.xi.1961 (*R. L. Coe*).

In the British Museum collection is a single female from the type locality of *O. hamata,* the Mishmi Hills of Assam. Again it has the same colouring as *hamata* and *maculata,* but the antenna is intermediate in structure. The style is thickened and has a distinct dorsal spine (Text-fig. 6). This specimen implies that *hamata* and *maculata* might be extremes of one species, but the differences in genitalia seem decisive. Perhaps there is a small group of sibling species in the Himalayas.



FIGS. 4–6. Antennae of *Oldroydia hamata* (4), *O. maculata* (5) and of the specimen from Assam mentioned in the text (6).

Cyrtopogon ornatus **sp. n.**

A large, black species, with conspicuous dark markings on the wings, and tufts of white hair on body and legs. These details distinguish it from the two species described by Bromley (1935). *C. laphrides* Walker, 1851—the type of which is not to be found in the British Museum, but three specimens from S.E. Tibet agree with the original description—differs from *ornatus* in having the body and legs almost obscured by dense, tawny hairs.

MALE. *Head.* Hairs of frons, face and antennae fine, long, silky and all black. Upper occiput and a strip along eye-margins with black hairs, but lower occiput with dense white hairs. Antennae entirely black.

Thorax. Pronotum and propleuron covered with thick white tomentum, and with long, white hairs. Mesonotum black-brown, with fine, black hairs arranged in a pattern leaving bare a pair of longitudinal stripes. Humeri and two spots touching them have white tomentum but black hairs : on transverse suture are two more tiny white spots. Scutellum uniformly black-brown with long, erect, black hairs. Pleura black with thin whitish tomentum and isolated tufts of long, dense hairs. Mesopleural tuft predominantly white, with some black hairs ; metapleural tuft mostly black.

Abdomen. Broad at base, and stout, shining black dorsally, with only small, white triangles in extreme corners of segments in posterior half of abdomen. Hairs entirely black, long and erect, densest and most conspicuous at sides of first four tergites.

Legs. Black and with predominantly black hairs. White tufts on coxae and, most prominently, on apical half of fore femora ; posteriorly and on basal half of hind tibiae a long white tuft ; a golden yellow fringe on posterior face of hind tibia and tarsus.

Wings. Venation normal for genus. Cross-veins at base and apex of discal cell heavily stained brown, as is costa. Tip of wing as far back as first posterior cell is also brown-stained. Brown colour is produced by densely packed microtrichiae, which are subject to abrasion, and so one would expect to find variation in these markings in different individuals. Halteres orange.

Length of body 14 mm.; of wing 12 mm.

FEMALE. Closely resembles male in markings. Patches of white tomentum behind humeri and on posterior segments of abdomen larger, and apex of wings less distinctly darkened.

Holotype ♂, 1 ♀ paratype : NEPAL : Taplejung Dt., damp evergreen oak forest above Sangu, c. 10,400 ft., 2–26.xi.1961, " flying swiftly over path in clearing " (*R. L. Coe*).

Machimus ? assamensis Ricardo, 1919

Machimus assamensis Ricardo, 1919, *Ann. Mag. nat. Hist.* (9) **3** : 46.

NEPAL : Taplejung Dt., between Sangu and Tamrang, deep river gorge, c. 5,200 ft., x–xi.1961 ; 1 ♂ (*R. L. Coe*).

This male agrees with a short series of both sexes in the British Museum from ASSAM : Mishmi Hills, 4,000 ft. (*M. Steele*). I had set these aside as possibly a new species, but it seems that there is little tangible difference from Ricardo's species except that the forceps of Ricardo's male type are perhaps rather more slender. If we had a series of specimens that agreed with the type in this respect I should have more confidence in describing the Nepal material as a new species.

Neolaparus coei sp. n.

The recent catalogue of Rattan Lal (1960) lists only one Indian species of *Neolaparus*, *N. volcatus* Walker, 1849 (*hypsaon* Walker, 1849 ; *bifidus* Wulp, 1898). This is a dark brown species with uniformly brown wings. In the British Museum are examples of two or three unnamed species from Southern India and Ceylon, but the species brought back by Mr. Coe is distinguished from all these by the wing, which is faintly smoky and has a sharply defined, darker stigma behind the tip of *Sc* and R_1. It is a rather unusual *Neolaparus* in having only a very small and inconspicuous spur on the fore tibia, and in having hairs and even weak bristles on the scutellum. I have pleasure in naming it after the collector.

The two sexes of this species are exactly similar except for the genitalia, which are of no help in determining the species, so a single description will suffice.

Head. Frons and face dark brown with a tomentum that shifts in colour from bronze to dark brown as the specimen is rotated. Frons with a narrow, shining black line vertically between the antennae, and a single row of fine black hairs along each eye-margin. Very prominent ocellar tubercle with two strong black bristles. Moustache reduced to a double row of light brown bristles, and above this, up bases of antennae, sparse fine brown or black hairs. Antennae with first two segments relatively stout and equal in length, yellow, with long yellow hairs ventrally and some black ones above ; third segment slenderly clavate, darker, covered with velvety pile, which also extends over first segment of style ; second segment of style is a narrow spine. Palpi and proboscis dark brown, partly yellowish, with yellow hairs. Buccae narrow at base ; occiput with pale yellowish tomentum and a single row of short bristles, pale or brown.

Thorax. Velvety reddish brown with black pattern, which varies in intensity, but consists dorsally of paired black stripes with three black spots on each side. Pleura sharply divided horizontally, with a velvety brown band across ventral half of sternopleuron and pteropleuron, extending on to upper areas of coxae ; mesopleuron with a black spot, otherwise upper pleura yellowish. Bare of hairs except for vertical fringe of pale bristles immediately before halteres.

Abdomen. Dorsally shining black with a greenish sheen. A row of median red spots is small on first and second segments, but larger on posterior segments. Segments 3–5 with a red basal band. Clothed with short black hairs, and a few pale ones laterally. Venter reddish, dull, with yellowish tomentum and yellow hairs.

Legs. Femora and lower half of coxae light brown or yellowish ; tibiae light brown, darker at tips ; tarsi brown. Hairs and bristles varying from light to dark brown.

Wings. Lightly smoky, with a little darker brown along veins, and especially on forks and cross-veins. A conspicuous, clearly defined, black brown stigma between tips of *Sc* and R_1, spreading backwards into first posterior cell.

Length of body 9–10 mm.; of wing 9 mm.

Holotype ♂, 5 ♀ paratypes : NEPAL : Taplejung Dt., old mixed forest above Sangu, c. 6,200 ft., 25–28.x.1961, flying over dead leaves (*R. L. Coe*).

Neomochtherus sanguensis sp. n.

A small, slender black and grey species, not closely allied to any species known to me, and unique in its entirely black legs. The two sexes are closely alike in colour and pattern.

Head. Frons and face with white or yellowish tomentum. Frons with sparse row of fine hairs along each eye-margin ; ocellar tubercle small, with several weak black hairs. Antennae black : first two segments with greyish tomentum and black hairs ; third segment as long as first two together ; arista slightly shorter, facial knob weak. Moustache mainly white bristles and hairs, with a few black ones. Palpi and proboscis black with snow-white hairs, which extend also to beard and lower part of occiput. Upper occipital bristles black, strong but not long, and not proclinate.

Thorax. Mesonotum ashy brownish grey, with a pattern of darker brown : two admedian stripes and three quadrate spots on each side, and before scutellum a dagger-shaped black mark. Scutellum black with grey tomentum, which leaves two small black spots basally. Bristles and hairs black. Three pairs of strong dorsocentrals, all behind suture, and in front of this, fine hairs of diminishing length forwards. Two notopleurals, two supra-alars, two postalars and two marginal scutellars. Pleura black, but with thick whitish grey tomentum : fine white hairs and fine bristles in a vertical row on metapleuron and hypopleuron, mostly white, a few black ones dorsally.

Abdomen. Dorsally dull black brown : first segment, base of second and a broad apical band on second and subsequent segments, white. Clothed with black hairs, and along each side a row of long bristles, one or a pair on each side of each segment being either white or black. Venter black with brownish grey tomentum and fine white hairs.

Legs. Coxae and trochanters like pleura, rest of legs entirely black, clothed with fine white hairs ; bristles black on tarsi, mostly white elsewhere.

Wings. Without pigment, but heavily covered with microtrichia in all cells, thus giving wing a grey appearance. Halteres with brown stalk and yellow knob.

Length of body 13 mm.; of wing 11 mm.

Holotype ♂. NEPAL : Taplejung Dt., Sangu, c. 6,200 ft., resting on rocks in the sun, 9–17.x.1961.

Paratypes. NEPAL : Taplejung Dt., Sangu, c. 6,200 ft., resting on rocks in the sun, 9–17.x.1961, 6 ♂, 9 ♀ ; same locality, mixed vegetation by stream in gully, 1 ♀ (*R. L. Coe*).

Heteropogon nitidus **sp. n.**

A single specimen, unfortunately with the antennae completely broken off, of a slender and bare *Heteropogon* with shining black abdomen and scutellum, black femora and red tibiae ; the hind pair are black-tipped. *Heteropogon* is a Holarctic genus, not previously recorded from India.

The nearest relative of the present species seems to be *H. lugubris* Herman, 1905, from the Pamirs, but the face of *lugubris* is shining white instead of bronze, with the black and white bristles of the moustache differently arranged. Moreover, the description given by Engel (1925, p. 43) suggests that the abdomen of *lugubris* is bare and silvery only on the hind margins of the tergites, and that some at least of the tergites are reddish.

Head. [Antennae completely broken off, so that no antennal characters can be given.] Face and frons about one quarter as wide as head, with frons broadening only slightly above antennae. Frons black with white and golden tomentum and sparse black hairs. Ocellar tubercle very prominent, with four long, slender black bristles. Face broadening slightly towards mouth-margin, with thick yellow tomentum. Facial knob slight, moustache of black and yellow bristles, slender, rather widely spaced, extending over two-thirds of height of face. Proboscis and palpi black with some silvery hairs ventrally which merge with a sparse beard. A long row of black postocular setae.

Thorax. Mesonotum black, densely covered with brown and yellowish grey tomentum. Pattern appears as a broad brown median stripe and lateral spots. Scutellum, in striking contrast to mesonotum, is quite bare and shining black with four fine marginal bristles and some smaller marginals, but no hairs visible on disc. Pleura ashy grey, a little brownish dorsally. Mesopleural hairs black.

Abdomen. Dorsally bare, highly polished black with a slight greenish metallic sheen. The only trace of pattern is a pair of tiny white spots at extreme sides of first five segments (two pairs on second segment). Very short and sparse yellowish hairs over all dorsum, longer white ones laterally. Venter with greyish tomentum and whitish hairs. Eighth segment of female curiously flattened above, and with acanthophorites bearing a crown of short black spines.

Legs. Coxae like pleura. Femora shining black, slender ; middle and hind femora with a conspicuous black preapical dorsal bristle ; all femora with two white antero-basal bristles and with some long white bristly hairs ventrally. Fore and middle tibiae and tarsi dark red with black tips to tarsi. Hind tibiae clavate, red with black tip ; basitarsus very swollen, black, other tarsal segments tapering gradually, also black. Hind coxae with a distinct anterior process.

Wings. Venation generalized. All cells on wing-margin open, including anal cell. Wing stained smoky brown, becoming rather paler in anal and axillary cells. Halteres clear brown.

Holotype ♀. NEPAL : Taplejung Dt., damp evergreen oak forest above Sangu, c. 8,500 ft., 2–26.xi.1961 (*R. L. Coe*).

***Philonicus curtatus* sp. n.**

(Text-figs. 7–8)

A black-legged species, rather close to the widespread Palaearctic *P. albiceps*, but distinguished, at least in the female, by the blackish brown colour of the abdominal segments, with narrow white hind-margins, and by the distinctly shorter eighth tergite (Text-figs. 7, 8). Two female specimens in Mr. Coe's collection match another female standing unnamed in the British Museum collection.

FEMALE. *Head*. Covered with dense silvery tomentum and only sparsely hairy. Frontal hairs confined to a row of fine black hairs on each side. Face bare except for a moustache which covers only mouth-margin, and the small facial hump ; moustache white ventrally, black dorsally. Beard silky, shining white. Upper occiput with a row of strong black bristles. Proboscis and palpi black with silky hairs ventrally and otherwise yellow hairs. Antennae entirely black with black bristles.

Thorax. Black brown with ashy grey tomentum, which leaves on mesonotum a broad, divided median stripe merging into a prescutellar patch, and laterally to this three spots on each side. Scutellum all grey, without marginal bristles in the holotype, and with two or possibly four in the paratype. Other bristles : two notopleurals, one supra-alar, and two postalars all strong and black. Otherwise mesonotum is clothed with short black bristles ; humeri with fine silky white hairs and no bristles. Pleura with white tomentum, white bristles in a row in front of halteres, and some fine white hairs elsewhere.

Abdomen. Of distinctive pattern. Each segment with black brown tomentum and fine black hairs over most of disc, grey ones on narrow hind margin and broader lateral areas. Each tergite with a row of black bristles on hind margin of dark spot, lateral bristles of each row long and strong. Sternites dark grey with black bristles in middle and slender black ones on hind margin of darker area, leaving posterior margin of each segment paler and bare. Some fine white hairs anteriorly and laterally. Ovipositor as in Text-fig. 7, of *Philonicus*-type with upturned bristles at tip, but with eighth tergite distinctly shorter than in *P. albiceps* (Text-fig. 8).

Legs. Coxae grey like pleura, but some at least of strong bristles black and conspicuous. Rest of legs black with black bristles, but entirely clothed with fine white hairs.

Wings. Faintly and uniformly smoky, with microtrichiae in almost all cells. Halteres dull orange.

Length of body 17 mm.; of wing 13 mm.

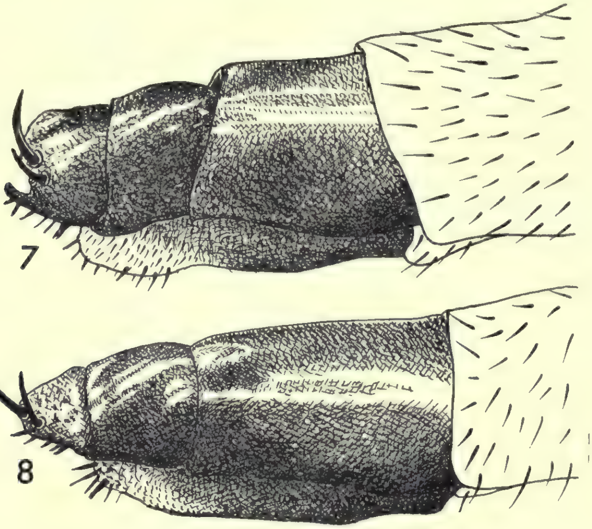


FIG. 7. Ovipositor of *Philonicus curtatus*, sp. n.
FIG. 8. Ovipositor of *Philonicus albiceps* Meigen.

Holotype ♀, 1 ♀ paratype. NEPAL: Taplejung Dt., Sangu, c. 6,200 ft., resting on rocks in sun, 9–17.x.1961 (*R. L. Coe*).

Paratype ♀. ASSAM: Khasi Hills. (Purchased from E. Heyne.)

Cophinopoda chinensis (Fabr.)

NEPAL: Taplejung Dt., Sangu, c. 6,200 ft., on mixed vegetation by stream in gully, ix–xi.1961, and on yellow blooms of cultivated Compositae (*Guizotia abyssinica* Cassini), 16–29.x.1961, 2 ♀ (*R. L. Coe*).

The relationships of this species are discussed below.

Cophinopoda Hull

Hull, 1958, *Proc. ent. Soc. Washington* **60**: 251.

Type, *Asilus chinensis* Fabricius, 1794, by original designation.

It has been known for many years that the yellow-and-black Asilidae standing in collections as *Ommatius chinensis* (Fabricius) probably included more than one species, and certainly did not belong to the genus *Ommatius* Wiedemann.

Specimens falling into this category occur in the Far East from Japan and Korea south to Queensland, and round the shores of the Indian Ocean to Madagascar. They share a distinctive appearance : robust, 20–25 mm. in length, with a rounded head, a stout abdomen, colour generally dull black except for the reddish abdomen, but generally covered with tawny tomentum and black hairs and bristles, wings smoky yellow brown.

The definitive character of the genus *Cophinopoda* is a small patch of hairs immediately above the base of each haltere, just below what is usually called the metanotal callosity. Fortunately it is not necessary to depend upon this for identification, because the genitalia are conspicuous in both sexes, and distinctive not only for the genus but for individual species. The upper forceps of the male are large and convex, and have a long, curved, ventral process ; the lower forceps are not developed, but the claspers are large and can be seen even without dissection, between the body of the upper forceps and its ventral process. In the females the eighth sternite is deeply notched posteriorly, dividing into two wings which are of distinctive shape and provided with distinctive bristles or long hairs.

Examination of all the material before me indicates that it can be divided into species that are separated territorially, and easily distinguished from each other by the genitalia as shown in Text-figs. 9–18.

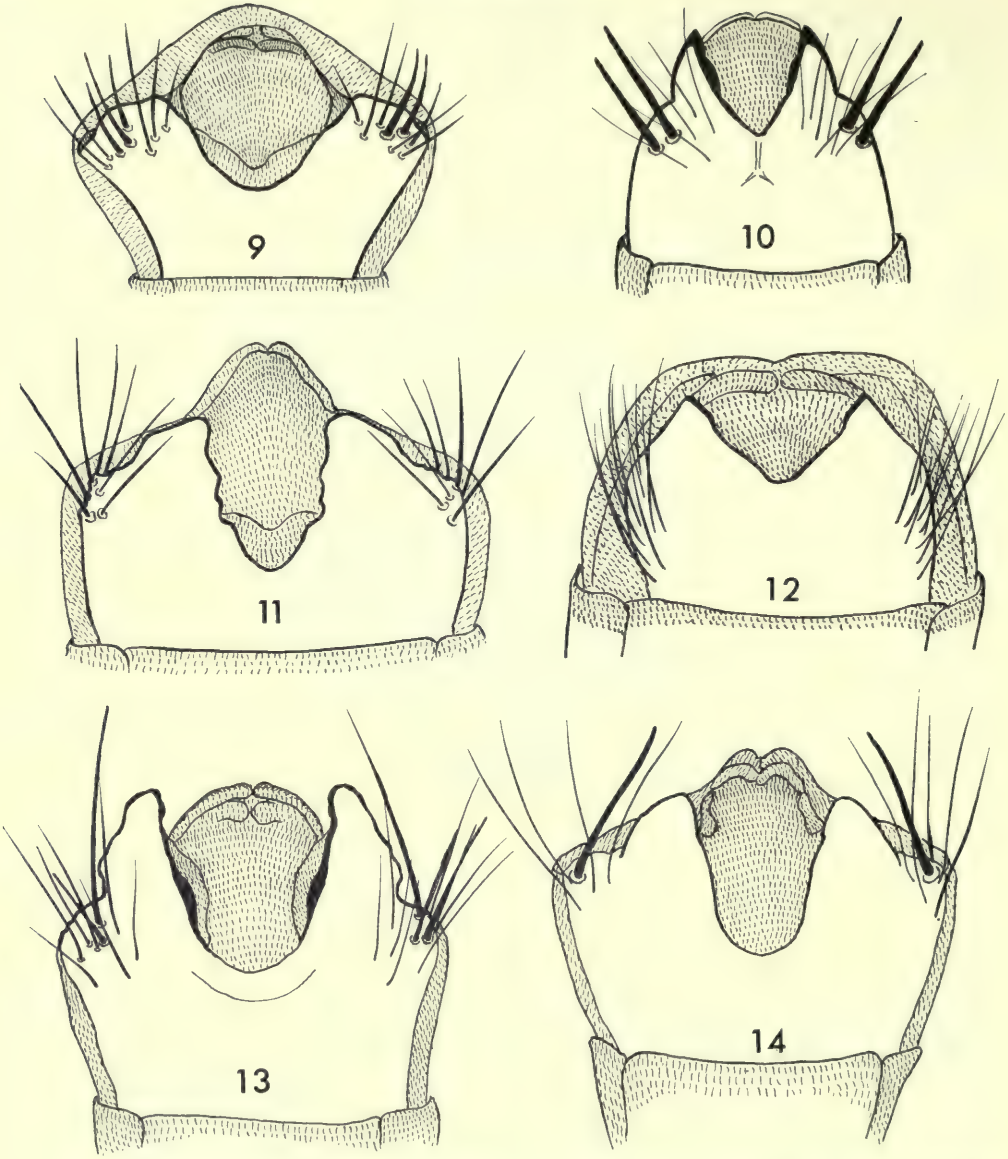
I can recognise six species : *pulchripes* (Bigot), *garnotii* (Guérin), *chinensis* (Fabricius), *andrewsi* sp. n., *timorensis*, sp. n. and *philippinensis* sp. n. In addition there is in the British Museum collection the female type of *Ommatius androcles* Walker, 1849, which was described as from " Sandwich Is.". This is clearly belonging to *Cophinopoda*, but both its specific identity and the correctness or otherwise of the locality are in doubt, as is explained below.

Cophinopoda pulchripes (Bigot) **comb. n.**

(Text-figs. 10, 18)

Ommatius pulchripes Bigot, 1859, *Ann. Soc. ent. France* (3) **7** : 419 ; Speiser, 1910, *Kilimandjaro-Meru Exped.* **10** (4) : 105–6 ; Lamb, 1922, *Trans. Linn. Soc. Lond.* **18** : 361.
Ommatius mayottae Bigot, 1859, *Ann. Soc. ent. France* (3) **7** : 422.
Ommatius chinensis Oldroyd, 1959, *Mém. Inst. sci. Madagascar* **11** : 302 *nec* Fabricius, 1794.

Many years ago I examined Bigot's types in the Hope Department of Entomology, Oxford, and formed the opinion that they belonged to one species which certainly extends from the Seychelles, through the Comoro Islands, to Madagascar. When I reviewed the Asilidae of Madagascar in 1959 I regarded this as a western extension of the distribution of *chinensis* Fabricius, but this was incorrect, as the figures of genitalia show. Hull (1962 : 438) correctly states that the Madagascar species is distinct from *chinensis* taken in the Far East, but unfortunately his illustration of the female (1962 : 800, fig. 2355), though labelled *chinensis*, is a dorsal view of *pulchripes*. Hull also states that *chinensis* has been recorded from Sokotra ; I have not been able to trace this record, but I should expect it to be *pulchripes*.



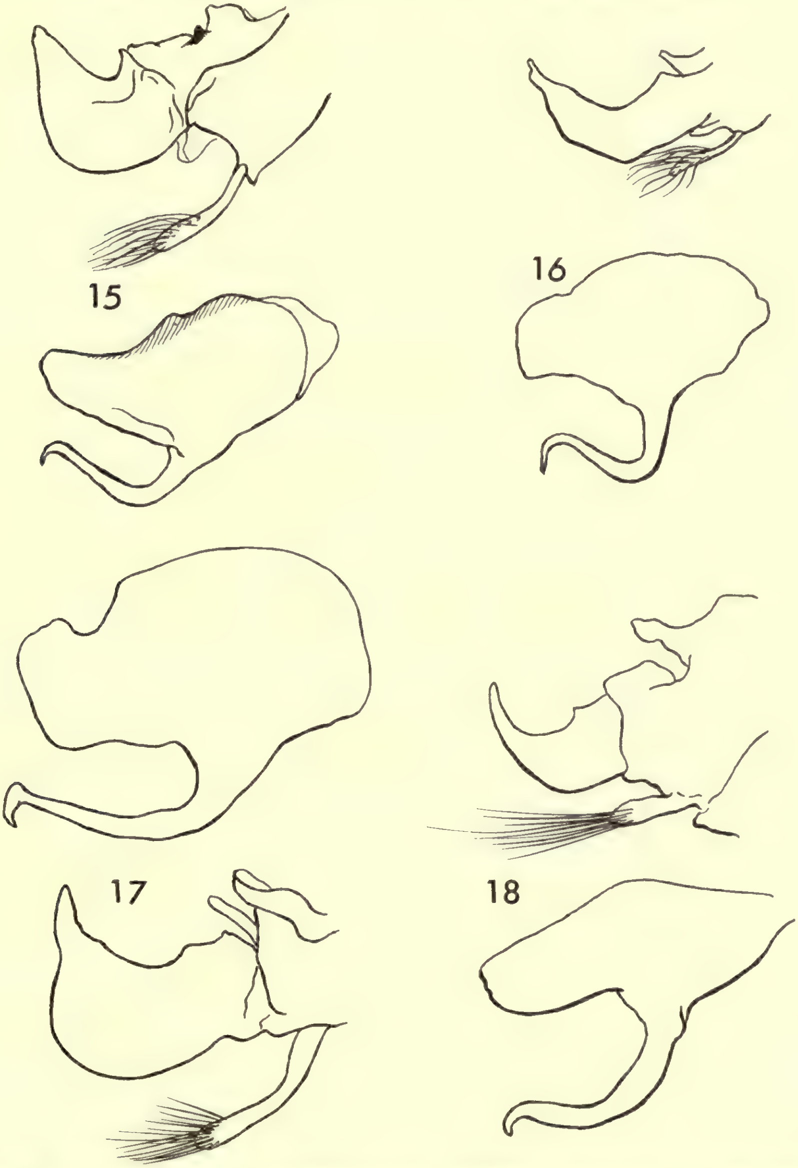
FIGS. 9–14. Female genitalia of *Cophinopoda* spp.: *chinensis* Fabricius (9) ; *pulchripes* Bigot (10) ; *garnotii* Guérin (11) ; *timorensis* sp. n. (12) ; *andrewsi* sp. n. (13), and *philippinensis* (14).

Cophinopoda garnotii (Guérin)

(Text-figs. 11, 17)

Asilus garnotii Guérin-Méneville, 1830, *Voyage autour du Monde . . . sur la corvette " La Coquille "*. *Atlas Ins.* pl. 20, fig. 8.

Ommatius pennus Walker, 1849, *List Dipt. Brit. Museum* **2** : 469.
Ommatius fulvus Doleschall, 1857, *Natuurk. Tijdschr. Ned. Ind.* (3) **4**, tab. VI, fig. 5.
Ommatius inextricatus Walker, 1862, *Proc. Linn. Soc. Lond.* **6** : 21.
Ommatius concinnens Wulp, 1872, *Tijdschr. v. Ent.* (2) **7** : 260.
Ommatius chinensis Ricardo, 1913, *Ann. Mag. nat. Hist.* (8) **11** : 163 ; Hardy, G. H., 1928, *Proc. Roy. Soc. Queensland* **40** : 62 ; Malloch, 1929, *Proc. Linn. Soc. N.S.W.* **54** : 408 ; Hardy, G. H., 1935, *Ann. Mag. nat. Hist.* (10) **16** : 168 ; *nec* Fabricius, 1794.



FIGS. 15–18. Male genitalia of *Cophinopoda* spp.: *chinensis* Fabricius (15) ; *andrewsi* sp. n. (16) ; *garnotii* Guérin (17), and *pulchripes* Bigot (18).

There is no original description of this species, but the coloured illustration, together with the figure of the antenna, show it to be *Ommatius chinensis* (Fabricius) as interpreted by the various authors cited above. Guérin himself came to that conclusion, for in the report of the same expedition (*Zoologie* **2** : 292) he records the same specimen as *Ommatius fulvidus* (Wiedemann), and this is one of the synonyms of *chinensis*. Guérin says that at the time that the plate was engraved he had not then seen Wiedemann's description, and he also adds that the specimen came from Buru in the Moluccas.

All specimens that I have seen from a wide area of the Far Eastern Archipelago, and down to Queensland, have genitalia of the type shown in Text-figs. 11, 17. G. H. Hardy's figure labelled "*Ommatius chinensis* ? Fab." (1935 : 169, fig. 20) clearly shows the clasper with the characteristically acute tip. The name *garnotii* is therefore available for this species, of which I have seen specimens from Queensland, the Solomon Islands, Amboina, Ceram, Borneo, Malaya (Selangor Dt.) and Thailand (Bangkok). These last localities on the continental mainland are rather surprising, but there is abundant confirmation among the specimens in the British Museum collection. Compare this with the distribution of *C. chinensis*, set out below.

Cophinopoda chinensis (Fabricius)

(Text-figs. 9, 15)

Asilus chinensis Fabricius, 1794, *Ent. Syst.* **4** : 383.
Dasypogon flavescens Fabricius, 1805, *Syst. Ant.*: 169.
Ommatius fulvidus Wiedemann, 1821, *Diptères exotiques* : 214.
Ommatius coryphe Walker, 1849, *List Dipt. Brit. Mus.* **2** : 469.
Ommatius pennus Walker, 1849, *List Dipt. Brit. Mus.* **2** : 469.

This species, also, is clearly defined by the genitalia of both male and female (Text-figs. 9, 15). It comprises all the specimens that I have seen from Korea, Japan, China, India and Ceylon, including the two specimens collected in Nepal by Mr. Coe, and listed earlier in this paper. It also includes all the specimens I have seen from Sumatra and Java.

The distribution of *chinensis* in relation to that of *garnotii* (Text-fig. 19) shows an unusual boundary through the Malacca Strait and the Java Sea, which does not coincide with any of the various "lines" that have been proposed in this region for different groups of animals.

[LECTOTYPE fixation for ***Ommatius pennus*** Walker

Ommatius pennus Walker (1849, *List Dipt. Brit. Mus.* **2** : 469) was described from two specimens, listed thus : *a* Corea. Presented by Sir E. Belcher. *b* Borneo. Presented by the Admiralty. Both specimens exist in the British Museum collection, and support the conclusions about distribution given in the present paper : the specimen from Korea (Corea) has the genitalia of *chinensis* (Fabricius) and the specimen from Borneo belongs to *garnotii* (Guérin).

I hereby designate the specimen *a* from Korea as the lectotype of *Ommatius pennus* Walker, making this name a synonym of *chinensis* (Fabricius). Under

Recommendation 74E of the International Code of Zoological Nomenclature, 1961, the specimen *b* from Borneo becomes a paralectotype of *Ommatius pennus* Walker, even though it is specifically distinct from the lectotype.]

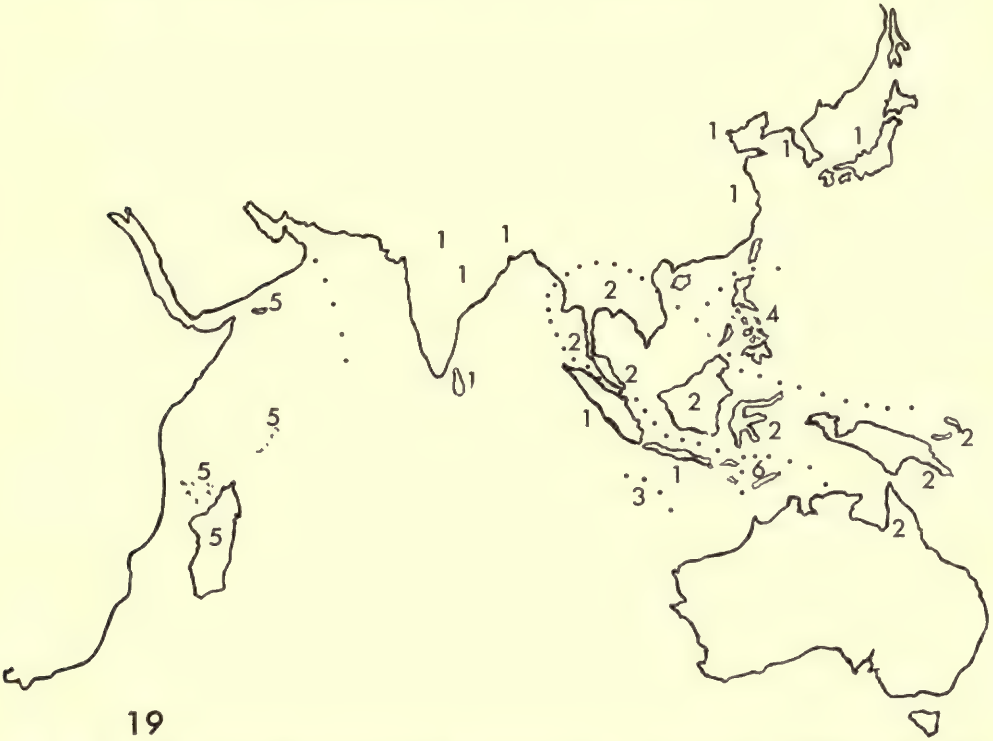


FIG. 19. Map of the known distribution of the species of *Cophinopoda* : *chinensis* Fabricius (1) ; *garnotii* Guérin (2) ; *andrewsi* sp. n. (3) ; *philippinensis* sp. n. (4) ; *pulchripes* Bigot (5), and *timorensis* Bigot (6).

Cophinopoda andrewsi sp. n.

(Text-figs. 13, 16)

A large black species, lacking the tawny tomentum of the mesonotum which is a feature of all the other species except *pulchripes*. From *pulchripes*, *andrewsi* is distinguished by the larger size, by having the tibiae dull red instead of reddish yellow, and the fore tarsi without tufts of pale hair laterally and by the very distinct genitalia in both sexes (Text-figs. 13, 16).

FEMALE. *Head.* Frons blackish with thin yellow tomentum, and with abundant black hairs in tufts : one tuft on each side of vertex along eye-margin ; one tuft each side above antennae ; and a dense tuft of stiff black hairs behind ocelli. First two antennal segments orange with black hairs, third segment black. Face orange in ground colour with yellow tomentum and covered with fine hairs, merging into stiff bristles in lower mystax ; proportion of black to yellow varies, but usually predominantly pale. Proboscis and palpi black with pale hairs. Beard pale. Occipital hairs and bristles mainly pale, some black.

Thorax. Mesonotum black with ashy grey tomentum, forming an indistinct pattern, with a pair of median darker stripes visible only posteriorly. Evenly covered with short, bristly black hairs, longer posteriorly and on black scutellum. Humeri and postalar calli dull reddish, with rather longer hairs, especially on postalar calli. Very strong black bristles : 2 presutural, 1 supra-alar, 1 postalar, 6–8 pairs dorsocentrals, all clustered behind base of wing ; two marginal scutellars. Pleura ashy grey with blackish patches ; hairs mostly soft, yellow, but black cluster on mesopleuron.

Abdomen. In ground colour black with narrow orange hind margins, and fairly long yellow hairs, mingled with a few black ones. Venter similar. Female genitalia as in Text-fig. 13.

Legs. Femora black with yellow clothing hairs. Tibiae dull red, without black tips. Tarsi black or partly dull reddish, especially basally. Bristles of legs black.

Wings. Without distinctive features.

Length of body 27 mm.; of wing 22 mm.

MALE. Closely similar, genitalia as in Text-fig. 16.

Holotype ♀, 8 ♀, 18 ♂ paratypes, all from CHRISTMAS ISLAND, 1897 (*C. W. Andrews*) (B.M. 1898–20, 1909–66).

Other paratypes, also from CHRISTMAS ISLAND : 3 ♂, 1 ♀ collected by Dr. *C. A. Gibson-Hill*, 1939–40 (ex F.M.S. Museum, B.M. 1955–354) ; 2 ♂, 1 ♀, coll. *M. F. W. Tweedie*, viii.–ix.1932 (ex F.M.S. Museum, B.M. 1955–354).

The account of the expedition given by Mr. Andrews (1900, A Monograph of Christmas Island (Indian Ocean), London, British Museum (Natural History)) shows clearly that this is the Christmas Island that is situated south of Java, and not the island of the same name in the Pacific.

Cophinopoda philippinensis sp. n.

(Text-fig. 14)

Ommatius fulvidus Osten-Sacken, 1882, *Berl. ent. Z.* **26** : 111, *nec* Wiedemann, 1821.

Osten-Sacken, in his account of Diptera from the Philippine Islands, brought home by Dr. Carl Semper, records : " *Ommatius fulvidus* Wied. A. Z. I. 420. Must be as common in the Philippines as in Amboina, Celebes, etc.".

The single female I have seen from the Philippine Islands looks, indeed, indistinguishable from *chinensis* Fabricius (*fulvidus* Wiedemann), until we look at the genitalia, which are sharply different. Until I have more specimens for comparison I am not able to give any other points of difference, but the genitalia have proved so diagnostic in this genus that this one structure is sufficient to define the species (Text-fig. 14).

Cophinopoda timorensis sp. n.

(Text-fig. 12)

The only known specimen is so similar in general appearance to *C. chinensis* that it is difficult to pinpoint any significant differences. The brown tomentum of the head and thorax is perhaps more greyish, and the tibiae have more distinct apical black rings, especially the fore tibiae. The species is really defined on the female genitalia as shown in Text-fig. 12.

Holotype ♀. TIMOR : a single specimen collected by *Alfred Russell Wallace*, and given by him to W. W. Saunders. It came to the British Museum with Saunders' collection, B.M. 1868–4.

Wallace's comments in his book THE MALAY ARCHIPELAGO (1894) on the origin of the fauna of Timor are apt in comparing this species with the others of the genus.

THE IDENTITY AND ORIGIN OF *Ommatius androcles* Walker, 1849

As already stated, this species was founded upon one specimen, a female recorded as from : " Sandwich Island. Presented by Captain Beechey ". This specimen stands in the British Museum at the present day, but unfortunately its eighth sternite is broken, and the most that can be said of it is that it appears to be indistinguishable from *Cophinopoda chinensis* (Fabricius).

The locality attributed to this specimen is especially intriguing because no Asilidae are known from the Hawaiian Islands. Captain Beechey, who commanded the sloop H.M.S. *Blossom*, was despatched to the Pacific during the years 1825–28 for the purpose of waiting in the Behring Strait in case either Parry or Franklin should succeed in finding a North-West Passage. During the periods in which the Strait was frozen, Captain Beechey was ordered to cruise usefully among the islands of the Pacific, charting and surveying. He called twice at " Woahoo " (=Oahu) and actually left his naturalist there for eight months from May, 1826–January, 1827. The naturalist, Mr. Tradescant Lay, was suffering from dysentery, and Captain Beechey reasonably argued that he would be more usefully employed ashore in Hawaii than cruising in Behring's Strait.

There is thus no direct reason to question the locality of the Asilid : it could have been taken in Oahu. On the other hand it could have been taken later on the voyage when the ship called at Macao. Here officers not only went ashore, but lived ashore for some time in the houses of Portuguese officials. One would think that if anyone did this the naturalist would be among them. He might easily have caught this fine Asilid there and afterwards mistakenly included it in his Hawaiian catch.

I asked Prof. D. Elmo Hardy for his opinion, and he concurs in the view that Walker's type is probably a *chinensis* from the mainland. Prof. Hardy thinks it unlikely that such a large predatory insect would have become totally extinct in Hawaii since Beechey's time ; while I am impressed by the similarity to the eighth sternite of *chinensis*, and feel that if the species had really lived in such isolation on the Hawaiian Islands it would have become as distinct as *andrewsi* or *philippinensis*.

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DIPTERA FROM NEPAL

SYRPHIDAE

By R. L. COE

SYNOPSIS

The material studied comprises twenty-two genera and sixty-two species, of which eleven are described as new. Some existing species are discussed and where necessary redescribed, and keys are included to certain genera.

INTRODUCTION

THE bulk of the material dealt with in this paper was collected by the author while a member of the British Museum (Natural History) East Nepal Expedition 1961–62. Also included is other B.M. (N.H.) material from South-East Asia and two collections from the same region submitted for identification by Drs. F. Kuhlhorn and F. Keiser, of the Zoologisches Sammlung des Bayerischen Staates, Munich, Germany and the Naturhistorisches Museum, Basel, Switzerland respectively.

As entomologist with the British Museum expedition, I was working in the field from late September to early February, a period when most of the wild plants were in seed and failed to attract Syrphidae. Moreover, cold winds and frequent frosts had by late November decimated the insect population except in sufficiently sheltered places. In the high damp evergreen oak forest above our base camp at Sangu, frost and frozen snow had by that time restricted successful collecting to barely an hour around midday when the overhead sun raised the temperature along the narrow exposed track sufficiently for the insects to take flight from their obscure hiding places. During this brief spell of activity in the high forest Syrphidae were occasionally taken throughout the winter months at altitudes up to nearly 10,000 feet.

Near our base camp at around 6,200 feet a cultivated Composite (*Guizotia abyssinica* Cassini), from the yellow blooms of which the natives extract an oil, survived the nightly frosts of late December in a field facing south and sheltered by high evergreen shrubs from the north and east. Some interesting Syrphidae were attracted to the flowers. In early December the blooms of the same plant afforded good collecting on the Tumlingtar plateau in the Arun Valley at an altitude of about 2,000 feet. With wild blooms almost absent this cultivated plant was extremely useful for collecting Syrphidae and other insects, Hymenoptera in particular.

Of the species dealt with in this paper, fifty-one were collected in East Nepal, and an analysis of their distribution reveals some facts of interest. Only nine occur in the Palaearctic Region ; twenty-seven occur in the territories extending southward through Burma and Thailand as far as Sumatra and Java ; three occur still further south, i.e., in Northern Australia ; and three occur in the Ethiopian Region.

However, of the twenty-two genera taken in East Nepal, twenty occur in the Palaearctic Region ; one (*Megaspis*) occurs in the Ethiopian Region ; and one (*Lycastris*) is peculiar to the Oriental Region.

In the following text, collectors' names are given when the material was taken other than by the author.

Subfamily **SYRPHINAE**

Paragus tibialis tibialis (Fallén)

Pipiza tibialis Fallén, 1817 : 60.
Paragus tibialis (Fallén) Meigen, 1822 : 183.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from mixed vegetation by stream in gully, ix–x.1961, 1 ♂, 1 ♀.

The typical form of this species with its entirely black abdomen is cosmopolitan in its distribution.

Paragus tibialis rufiventris Brunetti

Paragus tibialis rufiventris Brunetti, 1913 : 157.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from mixed vegetation from stream in gully, ix–x.1961, 7 ♂ ; also from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 2 ♂ ; above Sangu, c. 6,500 ft., from evergreen scrub, 5–13.x. 1961, 1 ♂. Taplejung District, Dobhan, c. 4,000 ft., from cut rice steppes above River Maewa, 28.i.1962 2 ♂.

This form of *tibialis* occurs in India and Ceylon.

The following *Paragus* species all belong to the sharply differentiated group with very deeply serrated scutellum, bearing a marginal row of conspicuous teeth, as defined by Stuckenberg (1954 : 409).

Paragus crenulatus crenulatus Thomson

Paragus crenulatus crenulatus Thomson, 1869 : 503.

East Nepal : Arun Valley, Tumlingtar plateau, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♂.

Typical *crenulatus* is widespread in the Oriental Region.

Through the kindness of Dr. Kjellander, of Stockholm, I was enabled to compare my single example of the typical form of this species with the sole existing specimen in Thomson's collection at the Naturhistoriska Riksmuseum. They agree in all respects, thus confirming Stuckenberg's interpretation of Thomson's description.

Paragus crenulatus Thomson, dark form

Paragus crenulatus Thomson ; dark form, descr. Stuckenberg, 1954 : 412.

East Nepal : Arun Valley, Tumlingtar, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 3 ♂, 2 ♀ ; Taplejung District, Dobhan, c. 4,000 ft., from cut rice steppes above River Maewa, 28.i.1962, 2 ♂, 2 ♀.

This material agrees with Stuckenberg's description of three specimens from Calcutta, in which the body is dark, the mesonotal pile white, and the mesonotal stripes complete and silvery. Also, the thorax is more coarsely punctate than in the typical form, and has dull violaceous and a few cupreous reflections. As Stuckenberg remarks there is considerable variation within the species, which could probably be divided into several subspecies if more material became available.

Paragus yerburiensis Stuckenberg

Paragus yerburiensis Stuckenberg, 1954 : 415.

East Nepal : Arun Valley, Tumlingtar plateau, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 3 ♂, 1 ♀.

Described from India and Ceylon.

Paragus auratus Stuckenberg

Paragus auratus Stuckenberg, 1954 : 418.

East Nepal : Arun Valley, Tumlingtar plateau, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 6 ♂, 1 ♀.

Described from India, Ceylon and Africa.

Baccha maculata Walker

Baccha maculata Walker, 1852 : 223.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from mixed vegetation by stream in gully, ix–x.1961, 2 ♂.

Described from North India.

Baccha sp. near ***maculata*** Walker

East Nepal : Taplejung District, above Sangu, c. 6,300 ft., from old mixed forest, 25–28.x.1961, 1 ♀.

This specimen is close to *maculata*, differing from the single female example of the latter in the Brit. Mus. (Nat. Hist.) in the following respects :—frons and facial knob less prominent, side dusting on frons more evenly broad ; thorax, scutellum and pleurae shining black, not steely blue as in *maculata ;* tergites with the pale basal markings on 3–5 more restricted and pale yellowish.

Platycheirus albimanus (Fabricius)

Syrphus albimanus Fabricius, 1781 : 434.
Platycheirus albimanus (Fabricius) Verrall, 1901 : 280.

East Nepal : Khumbu, Thangpoche, c. 13,000 ft., 10.vii.1962, 2 ♀ (*G. Ebert, H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

Common in Europe and stated to occur in the Nearctic Region.

Platycheirus manicatus Meigen var. ***himalayensis*** Brunetti

Platycheirus manicatus Meigen var. *himalayensis* Brunetti, 1915 : 209.

East Nepal : Khumbu, Thangpoche, c. 13,000 ft., 10.vii.1962, series ♂, ♀ (*G. Ebert, H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

Described from 3 ♂ from Garhwal, West Himalayas (Zoological Survey, Calcutta).

Differs principally in ♂ from the typical European form of *manicatus* by having the front tarsi more conspicuously dilated.

Melanostoma univittatum (Wiedemann)

Syrphus univittatus Wiedemann, 1824 : 36.
Melanostoma univittatum (Wiedemann) Brunetti, 1915 : 208.

East Nepal : Arun Valley, below Tumlingtar, River Sabhaya, c. 1,800 ft., on sandy shore, 30.xii.1961, 1 ♀.

Widely distributed in Oriental and Australian Regions.

Melanostoma orientale (Wiedemann)

Syrphus orientalis Wiedemann, 1824 : 36.
Melanostoma orientale (Wiedemann) de Meijere, 1908 : 312.

East Nepal : Taplejung District, Sangu, 6,200 ft., from blooms of *Guizotia abyssinica*, Cassini 10–16.xii.1961, 1 ♂, 3 ♀ ; also from mixed vegetation by stream in gully, ix.1961–i.1962, 2 ♂, 1 ♀ ; and from blooms of wild cherry, 15–18.xi.1961, 2 ♂, 1 ♀ ; Taplejung District, Dobhan, from mixed vegetation by stream in deep gully, c. 3,500 ft., i–ii.1962, 1 ♀.

Widely distributed in Oriental Region.

Sphaerophoria indiana Bigot

Sphaerophoria indiana Bigot, 1884 : 99.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 2 ♂ ; also from mixed vegetation by stream in gully, ix–x.1961, 1 ♂, 1 ♀ ; Arun Valley, Tumlingtar plateau, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10.xii.1961, 2 ♂, 3 ♀.

Occurs in India, Ceylon and China.

Syrphus torvus Osten-Sacken

Syrphus torvus Osten-Sacken, 1875 : 139.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from damp evergreen oak forest, 2–26.xi.1961, 1 ♂ ; also, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♀ ; from blooms of wild cherry, 15–18.xi.1961, 1 ♀ ; and from foliage at edge of mixed forest, 17.xi.1961, 1 ♀.

Frequent in Europe and India.

My Nepalese material agrees with the series of European *torvus* in the Brit. Mus. (Nat. Hist.), except that in both sexes the dust on frons is golden instead of grey. However, a single ♀ from Sweden agrees with my series in this respect. Osten-Sacken described his *torvus* from North America, but I have seen no material from that sub-continent that agrees with the species as now understood, and it is possible that there are two species confused here.

***Syrphus pellucidipennis* sp. n.**

(Text-figs. 1–2)

Female. Length (exclusive of antennae), 15·5 mm.; wing-length, 14·5 mm. Eyes rather narrowly separated at vertex, the space between them steadily increasing from shortly above front ocellus to their lowest extremity ; eye-hairs dense, yellowish, rather short above, longer below. Vertex shining blackish olive, scarcely dusted, with short black hairs. Frons shining olive, with dense wide golden dusting at sides ; lunula shining blackish olive. Face (Text-fig. 2) broad, broader than the maximum width of an eye, very shortly descending below eye-level, moderately hollowed beneath antennae and with moderately produced central prominence ; yellow, with rather sparse pale golden dusting except on the shining, more orange, central prominence. Antennae greyish black, the first segment slightly shining, second and third dull ; first and second subequal in length, third about as long as first two together, rather narrow, tapering towards tip. Arista rather short, reddish, slightly darkened towards tip.

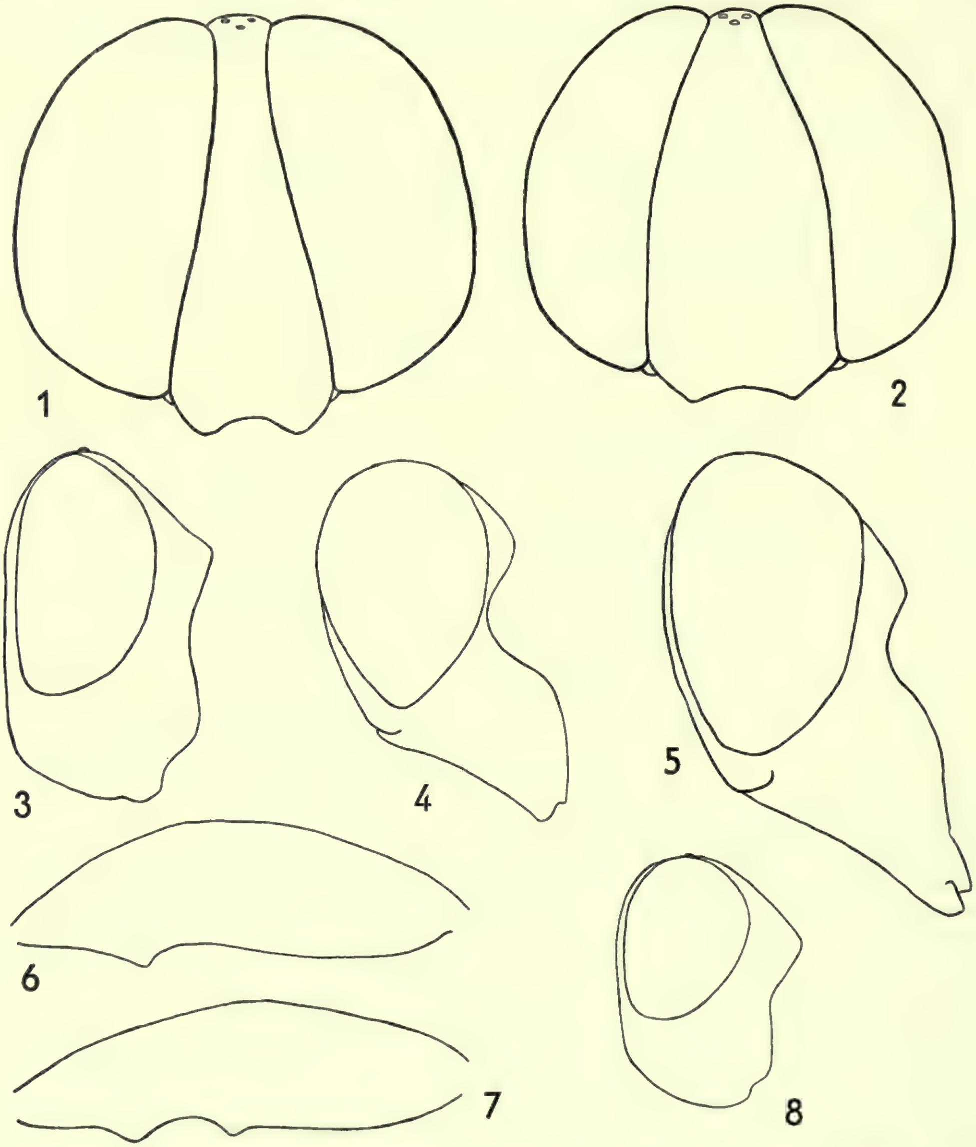
Thorax greyish green, scarcely shining, becoming orange at sides, clothed with mainly rather short yellow hairs on disc and with longer light orange hairs at sides ; scutellum yellowish orange, slightly shining, with rather long fine intermixed yellow and black hairs. Pleurae mainly greyish green, extensively dulled by dense pale golden dusting and with moderately dense rather long light orange hairs.

Abdomen with first tergite and extreme base of second moderately shining grey ; remainder of second tergite black, dull towards base, shining towards tip, with a pair of narrow, widely divided yellow fasciae halfway along tergite, these not extending over side-margins ; third tergite black, similarly dull towards base, shining towards tip, with a tiny isolated reddish yellow spot at middle towards base and a slight trace of reddish at middle of hind-margin ; fourth tergite black, similarly dull towards base, shining towards tip, with a much more extensive reddish marking spreading across hind-margin and extending forward for a short distance at median line, thus appearing narrowly triangular ; fifth tergite with an almost equilaterally triangular reddish marking extending forward from hind-margin. Sternites mainly blackish.

Four anterior femora narrowly blackish at base, hind pair with more than basal half blackish, all tibiae yellowish, four anterior tarsi yellowish, hind pair darkened dorsally. Leg-hairs mainly following ground colour on the two anterior pairs, but on the hind pair the short black femoral hairs are continued over the yellow apical half, and the tibiae have numerous short black hairs for their entire length, these becoming conspicuous and close-set along the apical half.

Squamae yellowish, fringed with long golden hairs. Halteres yellowish. Wings pellucid apart from the light yellowish brown stigma.

Holotype ♀. East Nepal : Taplejung District, damp evergreen oak forest above Sangu, c. 9,200 ft., 2–26.xi.1961. Brit. Mus. (Nat. Hist.).



Figs. 1–8. 1, 2, heads of ♀ *Syrphus* from in front. (1) *chrysotoxoides* Curran. (2) *pellucidipennis* sp. n. 3–5, 8, heads in profile. (3) *Ferdinandea longifacies* sp. n. (4) *Volucella flavoscutellata* Sack. (5) *V. varipila* sp. n. (8) *F. isabella* Hull. 6, 7, hind femora of ♂ *Pseudovolucella*, base to right, externo-lateral view. (6) *fasciata* Curran. (7) *hingstoni* sp. n.

The single example of this large, handsome species was taken resting on a fern leaf warmed by the sun's rays. Apart from the very restricted yellow markings on the abdominal tergites, its dull green thorax and hairy eyes would lead one at first glance to consider it a close ally of *torvus* Osten-Sacken (q.v.) of the *ribesii-vitripennis* group of the genus. However, the lower lobe of the squama is devoid on the disc of the numerous long yellow hairs characterizing that group, microscopic pile only being present.

Curran (1928 : 201) described a *Syrphus chrysotoxoides* from a single ♀ taken in Siam, and this example shares with my new species the combination of characters mentioned above. Curran's type specimen of *chrysotoxoides* is in the Brit. Mus. (Nat. Hist.), and is gummed to a card and in very poor condition. From certain omissions of detail in Curran's description it seems probable that he described it in its present state. Although sharing the characters detailed, *chrysotoxoides* differs from my new species in many respects. The face (Text-fig. 1) of *chrysotoxoides* is considerably narrower, at its maximum width being less than the maximum width of an eye ; antennae extensively reddish ; wings evenly smoky yellow ; all tergites extensively yellow ; sternites mainly yellowish ; and all femora entirely clear reddish orange.

Syrphus brunettii Hervé-Bazin

Syrphus brunettii Hervé-Bazin (pro *albostriatus* Brunetti nec Fallén), 1923 : 290.
Syrphus albostriatus Brunetti nec Fallén, 1923 : 72.

EAST NEPAL : Sangu, c. 6,200 ft., from mixed vegetation in deep gully, ii.1962, 2 ♂ ; from damp evergreen oak forest above Sangu, c. 8,500 ft., 2–26.xi.1961, 1 ♀.

The above material that I took in East Nepal and one ♂ and two ♀ in the Brit. Mus. (Nat. Hist.) from North East India agree with Brunetti's description of his supposed *albostriatus* Fallén, as amended to *brunettii* by Hervé-Bazin, except that Brunetti states that the eyes in the male are " absolutely contiguous for only a short distance ". Actually, both *albostriatus* and the material that I now identify as *brunettii* have the eyes touching for a considerable distance in the male. Unfortunately I have been unable to check the type series of *brunettii* at the Zoological Survey in Calcutta, but I am satisfied that Brunetti's statement is a *lapsus calami*. Further, had Brunetti's examples of the male truly had the eyes touching for only a short distance, Hervé-Bazin would surely have drawn attention to this further distinction from the true *albostriatus* when renaming the series.

Syrphus serarius Wiedemann

Syrphus serarius Wiedemann, 1830 : 128.

EAST NEPAL : Taplejung District, Sangu, c. 6,200 ft., from mixed vegetation by stream in gully, x.1961–i.1962, 1 ♂, 5 ♀.

Occurs widely in Oriental Region.

In this species the markings on the tergites vary a great deal, also in the female the frontal dust-spots may be present or absent and while the latter are usually grey they are yellowish in one of my Nepalese examples.

Syrphus ? nitens Zetterstedt var.

Syrphus nitens Zetterstedt (typical), 1843 : 712.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♂.

This single male example of a *Syrphus* of the *luniger* group agrees with the uncommon *nitens* in having the third and fourth tergites with the yellow bands not, or scarcely, broader than the black cross-band separating them, and than the black cross-band bounding the front margin of the third tergite and the hind margin of the second tergite. The yellow bands of the third and fourth tergites are, however, narrowly divided into lunules instead of being entire and the central prominence of the face is rather broadly darkened. Otherwise it agrees quite closely with typical male *nitens*.

Occurs widely in Europe (typical form).

Syrphus balteatus (Degeer)

Musca balteata Degeer, 1776 : 116.
Syrphus balteatus (Degeer) de Meijere, 1908 : 297.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from mixed vegetation by stream in gully, ix–x.1961, 1 ♀ ; also, between Sangu and Tamrang, c. 5,200 ft., from mixed shrubs in deep gorge, x–xi.1961, 2 ♂, 3 ♀. South of Katmandu, Rapti Tal, c. 980 ft., 23–27.iii.1962, 2 ♀, (*G. Ebert, H. Falkner*). The latter two examples are in the Zoologisches Sammlung des Bayerischen Staates.

Common and widespread in Palaearctic, Ethiopian, Oriental and Australian Regions.

Syrphus balteatus (Degeer) var.

East Nepal : Taplejung District, between Sangu and Tamrang, c. 5,200 ft., x–xi.1961, 1 ♂ ; also Sangu, c. 6,200 ft., from mixed vegetation by stream in gully, xi.1961–i.1962, 1 ♂, 2 ♀ ; and from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♂.

This is a curious variety in which the broad yellow bands on tergites, and frequently the narrow yellow bands also, are rather widely divided by a greyish black longitudinal stripe. In the field this difference in the markings is very noticeable. A ♂ and a ♀ in the Brit. Mus. (Nat. Hist.) from North-east India and Hong Kong respectively exhibit this same variation from typical *balteatus*.

Syrphus cinctellus (Zetterstedt)

Scaeva cinctella Zetterstedt, 1843 : 742.
Syrphus cinctellus (Zetterstedt) Verrall, 1901 : 392.

East Nepal : Taplejung District, below Sangu, c. 6,000 ft., from edge of small mixed wood, 4.xi.1961, 1 ♂. East of Katmandu, Dudh Kosi Tal, 10,350 ft., 24.vii.1962, 1 ♀ (*G. Ebert, H. Falkner*). Latter example in Zoologisches Sammlung des Bayerischen Staates.

Common in Palaearctic Region. Also recorded from North India.

Syrphus fulvifacies Brunetti

Syrphus fulvifacies Brunetti, 1913 : 161 (♀).
Syrphus fulvifacies Brunetti ; Brunetti, 1923 : 89 (♂).

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♀ ; also from mixed vegetation by stream in gully, xi.1961–i.1962, 1 ♂ ; above Sangu, c. 7,000 ft., on old stone wall, 7.i.1962, 1 ♀ ; and from leaves of shrubs on sunny ridge, 14.i.1962, 1 ♂, 1 ♀.

This small, distinct species was described by Brunetti (1913 : 161) from a single ♀ taken at Rotung in N.E. India on 26.ix.1918, and now in the Zoological Survey at Calcutta. Later (1923 : 89) he described the ♀ from a specimen taken at Kashmir in June, 1901. Brunetti does not state in which collection the latter example was deposited. It is certainly not in the Brit. Mus. (Nat. Hist.).

Curiously enough, while Brunetti named the species *fulvifacies* from its entirely clear yellow face (" wholly bright golden-orange " is his description) he separated it in his key to *Syrphus* species from *latifasciatus* Macquart by its having the " facial bump dark ", correctly quoting *latifasciatus* as having the " facial bump pale yellow ". The five examples of *fulvifacies* that I collected in Nepal all have the face entirely clear yellow and agree with Brunetti's description of that species.

In Brunetti's key mentioned above, the two species (*fulvifacies* and *latifasciatus*) run to couplet 16, and that section may be replaced by :—

16 Thorax glittering black or greenish black. Second and third tergites with the yellow bands broad, occupying more than half length of tergite. Frontal lunule pale yellow, concolorous with remainder of frons and the face . *latifasciatus* Macquart

– Thorax dull pale green. Second and third tergites with the yellow bands narrow, occupying not more than half length of tergite and usually less. Frontal lunule intensely black, shining, with small median orange area anteriorly *fulvifacies* Brunetti

Finally, although Brunetti records a ♀ *latifasciatus* (1923 : 87) from Simla, I have not seen an Oriental example of that species. Brunetti states that there is no doubt whatever of his identification being correct.

For the above emendation of Brunetti's key I have compared my Nepalese series of *fulvifacies* with the European material of *latifasciatus* in the Brit. Mus. (Nat. Hist.).

Syrphus confrater Wiedemann

Syrphus confrater Wiedemann, 1830 : 120.

East Nepal : Taplejung District, above Sangu, on old stone wall, c. 7,000 ft., 7.i.1962, 1 ♂ ; Sangu, from mixed vegetation by stream in gully, c. 6,200 ft., xi.1961–i.1962, 3 ♀ ; and from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1962, 1 ♂. South of Katmandu, Rapti Tal, Hitora, c. 980 ft., 23–27.iii.1962, 1 ♀ (*G. Ebert, H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

Distributed throughout Oriental Region.

***Syrphus albipilus* sp. n.**

Female. Length (exclusive of antennae), 9·5 mm.; wing-length, 8 mm. Eyes rather broadly separated at vertex, the space between them parallel-sided until shortly below front ocellus, then steadily widening until just below level of antennae, after which the sides become parallel or even slightly convergent down to their lowest extremity ; eye-hairs dense, whitish, mainly rather long. Occiput dull greyish below, glittering pale bluish above, fringed with long, abundant, thickened hairs, which are whitish except towards vertex, where they become pale yellow. Vertex shining blue-black with purplish reflections, clothed with short dark hairs. Frons shining steely blue-black with a rather narrow cross-band of grey dusting following the line of a shallow median transverse depression and continued down against the eyes to the level of the antennae ; lunula shining orange anteriorly ; hairs on frons of medium length, whitish. Face narrow, shallow, almost evenly wide, flattish in profile, hardly hollowed under antennae and with a very slightly protruding shining black central prominence ; pale yellowish, sparsely white-dusted towards sides, with long whitish hairs. Antennae dull dark greyish, third segment rather long and narrow, tapering somewhat after middle, more than twice as long as first and second segments together ; arista short, blackish.

Thorax shining black with bluish reflections, clothed with rather long abundant whitish hairs. Scutellum yellow, moderately shining, with rather long hairs, which are mainly whitish interspersed with scanty blackish ones, but with some much longer black hairs apically ; fringed subapically with rather long fine whitish hairs. Pleurae silvery grey, extensively whitish dusted, the undusted parts moderately shining ; clothed with long whitish hairs.

Abdomen with first tergite light blue-green, shining except at sides, where it is white-dusted ; second tergite slightly shining black with just beyond middle a pair of shining light orange fasciae, which widen towards sides, occupying about one-third length of tergite on disc and about one-half laterally, these fasciae not quite reaching side-margins, the light grey area between the two suggesting that a complete band is sometimes present ; third tergite quite brightly shining all over, more than anterior two-thirds occupied by a straight orange band, which does not quite reach side-margins, remainder black ; fourth tergite similarly shining all over with an anterior orange band which widens towards sides, occupying about one-third length of tergite on disc and about one-half laterally, not quite reaching side-margins ; this band has a pair of narrow, well separated whitish grey fasciae imposed along its posterior margin, these not nearly reaching side-margins, remainder of tergite black ; fifth tergite shining steely blue-black. All tergites clothed with whitish hairs, moderately long on disc of first and second tergites, much longer at sides, succeeding tergites short haired. Sternites shining, pale yellow, black-banded with long whitish hairs.

Legs with coxae and trochanters grey ; four anterior femora black on about basal half, otherwise pale orange, with long white hairs posteriorly, hind pair completely black, with long white hairs anteriorly ; front tibiae pale orange with trace of a dark ring just after middle, mid pair similar but the darkened area is nearer to tip, hind pair more brownish orange, broadly darkened around middle ; tarsi completely darkened, except the hind metatarsi, which are rather lighter.

Wings pellucid, stigma very pale yellowish brown. Squamae whitish grey, fringed with long whitish hairs. Halteres with light orange stem and lemon yellow knob.

Holotype ♀. EAST NEPAL, Arun Valley, Tumlingtar plateau, on blooms of *Guizotia abyssinica* Cassini, c. 2,000 ft., 10–16.xii.1961. Brit. Mus. (Nat. Hist.).

This small species is clearly allied to the Ethiopian *adligatus* Wiedemann. Both belong to a group characterised by :– the abundant, long and thickened occipital hairs ; the flattish yellow face with slightly shining black central prominence ; abundantly hairy eyes in both sexes ; entirely black or dark grey antennae with short arista ; tergites 2–4 with orange or grey bands, entire or divided. Also in this group are *serarius* Wiedemann (Oriental Region) and *claripennis* Loew (Ethiopian Region). The group can be divided into those species that have the orange band on the third tergite about twice as wide, at least on disc, as that on the fourth tergite (*adligatus*, *albipilus*), and those in which the bands on the third and fourth (and usually the second) tergites are subequal in width (*serarius*, *claripennis*). In the former subgroup there is apparently a tendency for the coloration of these bands to be predominantly orange, and in the latter subgroup predominantly grey.

Although *adligatus* ♀ closely resembles *albipilus* ♀ it may be clearly separated by the following characters :— thorax dull greenish grey anteriorly, with a pair of closely approximated greyish median stripes (most clearly seen from behind) ; the yellowish subcostal cell with a conspicuous dark brown rectangular patch below the tip of subcostal vein ; the greyish white dusting across the frons broad.

Asarcina ericetorum (Fabricius)

Syrphus ericetorum Fabricius, 1781 : 425.
Asarcina ericetorum (Fabricius) Brunetti, 1915 : 210.

EAST NEPAL : Taplejung District, Sangu, c. 6,200 ft., from mixed vegetation by stream in gully, ix–x.1961, 1 ♂ ; and by rocky stream, 7–16.x.1961, 1 ♀.

This species with its numerous named varieties is common and widespread in the Ethiopian, Oriental and Australian Regions.

Asarcina aegrota (Fabricius)

Eristalis aegrota Fabricius, 1805 : 243.
Asarcina aegrota (Fabricius) Brunetti, 1915 : 210.

EAST NEPAL : 7.viii.1962, 1 ♂ (no other data), (*G. Ebert*, *H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

Common throughout the Oriental Region. Recorded from NORTH AUSTRALIA.

Xanthogramma (Ischiodon) scutellaris (Fabricius)

Scaeva scutellaris Fabricius, 1805 : 252.
Ischiodon scutellaris (Fabricius) Sack, 1913 : 5.
Xanthogramma (*Ischiodon*) *scutellaris* (Fabricius) Hull, 1949 : 290.

EAST NEPAL : Taplejung District, Dobhan, from cut rice fields above River Maewa, c. 4,000 ft., 28.i.1962, 1 ♀.

Widespread in India and elsewhere in the Oriental Region.

Subfamily **CHRYSOTOXINAE**

Chrysotoxum baphyrus Walker

Chrysotoxum baphyrus Walker, 1849 : 542.

EAST NEPAL : Arun Valley, Tumlingtar plateau, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♂.

Distributed through INDIA. Also recorded from CEYLON and VIETNAM.

Subfamily **CHEILOSIINAE**

Rhingia binotata Brunetti

Rhingia binotata Brunetti, 1908 : 59 (♂).
Rhingia binotata Brunetti ; Brunetti, 1913 : 166 (♀).

EAST NEPAL : Taplejung District, Sangu, c. 6,200 ft., from blooms of wild cherry, 15–18.xi.1961, 1 ♂ ; also c. 6,000 ft., from edge of small mixed wood, 4.xi.1961, 1 ♂ ; and c. 5,500 ft., from river bank below Tamrang Bridge, x–xi.1961, 1 ♂.

Recorded from NORTH INDIA and CEYLON.

Rhingia laticincta Brunetti

Rhingia laticincta Brunetti, 1908 : 58.

EAST NEPAL : Taplejung District, damp evergreen oak forest above Sangu, c. 8,500 ft., 2–26.xi.1961, 3 ♀ ; and edge of small mixed wood below Sangu, c. 6,000 ft., 4.xi.1961, 1 ♀.

Recorded from NORTH INDIA.

Cheilosia nigroaenea Brunetti

Cheilosia nigroaenea Brunetti, 1915 : 204.

EAST NEPAL : Khumbu, Khumdzung, c. 12,700 ft., 15.vi.1962, 1 ♀ ; and Dudh Kosi Tal, 10,350 ft., 24.vii.1962, 1 ♀ (*G. Ebert, H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

Recorded from NORTH INDIA.

***Ferdinandea longifacies* sp. n.**

(Text-fig. 3)

MALE. Length (exclusive of antennae), 12 mm. ; wing-length, 11 mm. Eyes in contact for somewhat more than length of vertex : eye-hairs rather long, pale yellow. Vertex small, narrow, light brown-dusted, with long, forwardly curved black hairs. Frons yellow, wide, rather prominent, densely yellowish white-dusted towards sides, with moderately long black hairs except on the shining orange, well-formed lunula. Face (Text-fig. 3) broad, descending, with deep jowls, only slightly concave immediately below antennae, moderately produced ; eye-margins very wide against middle and lower part of face, pale golden dusted ; face with similar dusting immediately below antennae and as rather broad lateral stripes extending down from eye-margins to upper mouth-edge, otherwise shining yellow ; lower part with rather numerous short black hairs at sides, otherwise bare. Antennae with first two segments short, second distinctly longer than first, both reddish brown; third segment short, roundish, similarly reddish brown, sometimes narrowly darkened above and at tip ; arista long, blackish.

Thorax dark olive brown to blackish, moderately shining, with four rather broad longitudinal grey or yellowish grey stripes, the inner pair straight, the outer pair forming two crescents, one anterior of, and the other posterior of, the transverse suture ; clothed with short brown and yellowish hairs, mainly anteriorly, and longer evenly disposed black hairs ; scutellum pale yellow, dullish, with rather short black hairs, evenly disposed except along anterior margin where they are replaced by short yellow hairs ; some scattered long black hairs are also present. Pleurae densely grey-dusted, with mainly long golden yellow hairs and some scattered black hairs.

Abdomen with tergites evenly shining brownish black, second and third with blackish cross-bands visible from behind ; the latter are clear of the posterior margins, rather broad, and reach practically to the side-margins ; tergites clothed with rufous hairs, short and sometimes paler on disc, long at and towards sides, on most of fifth tergite and on the dull, greyish black-dusted pregenital segment. Sternites shining glassy grey-black, with long yellow or rufous hairs.

Coxae and trochanters blackish, heavily grey-dusted. Four anterior femora with slightly more than basal half black, otherwise reddish yellow, hind pair with the dark area rather more extensive. Tibiae orange-yellow, apart from a broad sometimes incomplete blackish ring on front pair just after middle ; middle tibiae sometimes have at least a trace of such a ring. Four anterior tarsi reddish yellow apart from the darkened last two segments, hind pair so apart from the darkened terminal segment. Hairs on femora mixed black and yellowish, long behind and below on two anterior pairs, long in front and below on hind pair ; those on two anterior pairs of tibiae and tarsi mixed short yellow and black, those on hind tibiae and tarsi almost entirely short yellow.

Wings with greyish membrane, stigma brownish yellow, surrounding area and base of wing more or less yellowish, discal and basal cross-veins more or less distinctly clouded. Squamae whitish grey with long golden fringes. Halteres with greyish or light brownish stem and dark brown knob.

FEMALE. Eyes rather narrowly separated. Otherwise resembling male.

Holotype ♂. EAST NEPAL, Taplejung District, from damp evergreen oak forest above Sangu, c. 9,200 ft., 2–26.xi.1961.

Paratypes. 1 ♀ with same data as holotype ; 4 ♂ with same data as holotype, except altitude 8,500 ft. N.E. INDIA : Naini Hills, 7–8,000 ft., 23.v.1927, 2 ♂, (*R. C. Jermyn*) ; Mishmi Hills, Delai Valley, Talon, c. 4,840 ft., 25.xi.1936, 1 ♀, (*M. Steele*).

All the above material is in Brit. Mus. (Nat. Hist.).

It is worthy of note that all my series of male paratypes were taken resting on a stony forest path during the brief period when the sun had attained the meridian and its rays reached the spot through a gap in the foliage overhead. The male holotype was captured under similar conditions higher up in the forest, where in the shade away from the path the single female taken was flying slowly round the base of a young oak tree which had sappy exudations low down on the trunk. Two of the European representatives of the genus, *cuprea* Scopoli and *ruficornis* Fabricius, pass their larval stage in sap exuding from such wounds in various trees.

The following key will suffice to distinguish the six species of *Ferdinandea* now known from the Orient.

1 Tergites almost entirely reddish brown, not metallic ; wings without a trace of clouding ; legs entirely yellowish ; length (exclusive of antennae), 12 mm.; wing-length 11 mm. . . . . **montana** Hull (India)
– Tergites metallic, not at all reddish brown 2
2 All femora black except at actual tip (i.e., much less than apical third yellow) . 3
– All femora with at least apical third yellow or yellowish brown ; no cloud extending down from stigma 4
3 Wing with a strong brown cloud extending down from stigma over discal cross-vein ; length (exclusive of antennae), 12 mm.; wing-length, 11 mm. **maculipennis** Curran ♂ type only, ♀ unknown (Malaya)

– Wing with no cloud extending down from stigma ; length (exclusive of antennae), 11 mm.; wing-length, 10 mm. . ***sumatrensis*** de Meijere ♂ type only (not seen), ♀ unknown (Sumatra)

4 Second and third tergites black-haired on the purplish black cross-bands ; jowls shallow, not extending much below lowest extremity of eye (i.e., for a distance far less than one-third of depth of eye) ; length 13 mm. ***formosana*** Shiraki ♂ type only, ♀ unknown (Formosa)

– Tergites entirely yellow- or rufous-haired ; jowls deep, extending far below lowest extremity of eye (i.e., for a distance exceeding one-third of depth of eye) . . 5

5 Coxae and trochanters somewhat brownish, four anterior femora brownish at base only, legs otherwise yellow ; face (Text-fig. 8) squat ; tergites gleaming aeneous black, second and third with no trace of posterior dullish black cross-bands ; length (exclusive of antennae), 11 mm.; wing-length, 10 mm. ***isabella*** Hull ♀ type only, ♂ unknown (Kashmir)

– Legs much more extensively darkened ; face noticeably long, produced downward ; tergites shining brownish black, second and third with posterior dullish black cross-bands visible at least from behind ; length, 11–13 mm. ; wing-length, 10–12 mm. ***longifacies*** sp. n. (Nepal and N.E. India)

Subfamily **VOLUCELLINAE**

Volucella varipila **sp. n.**

(Text-fig. 5)

MALE. Length (exclusive of antennae), 15·5 mm. : wing-length, 14 mm. Eyes in actual contact for less than length of frons ; eye-hairs long, dense, blackish brown. Vertex black, moderately shining, long white hairs behind, a few black hairs in front. Frons black, lightly brown-dusted, moderately shining, with short black hairs, which are mainly backwardly and outwardly inclined ; lunula shining black. Face (Text-fig. 5) broad, only slightly hollowed under antennae, then descending rather flatly well below eyes, central prominence hardly produced ; entirely black, moderately shining, with mainly adpressed short whitish hairs, these longer on upper part. Antennae with first and second segments short, first particularly so, both slightly shining blackish, third quite twice as long as deep, dull blackish grey ; arista fully three times as long as third antennal segment, brownish towards base, otherwise black, with long black plumes above, short, scanty ones below. Occiput inconspicuous, flattish, grey.

Thorax shining black, with long upright hairs, these mainly black, whitish on about posterior sixth ; scutellum clear lemon-yellow, moderately shining, with long whitish hairs and a row of numerous long black bristles along posterior margin. Pleurae shining black with traces of light brown dusting, long black-haired.

Tergites mainly shining black ; first grey-black, inconspicuous ; second shining black on disc, with a pair of large roughly triangular brownish yellow lateral fasciae which spread over the side-margins for entire length of tergite, hairs adpressed, whitish, longer towards sides ; third mainly shining black with a pair of rather large squarish, brownish yellow fasciae, these extending back from the front margin for the length of the tergite or nearly so, each fascia occupying about one-fifth width of tergite, which is long black-haired with some long rufous hairs posteriorly ; fourth shining black with long rufous hairs ; fifth segment moderately shining black, with long mixed rufous and black hairs. Sternites shining black, with long black hairs, a few rufous ones intermixed.

Legs black (in holotype the tibiae are obscurely brownish at base, but this is not usually so). Four anterior femora clothed for entire length with long black hairs ventrally and posteriorly, hind pair similarly clothed ventrally and anteriorly ; all tibiae with a posterior fringe of shortish black hairs, some longer bristly hairs present at or just beyond middle ; hind pair moderately curved after middle and flattened on inner side for more than apical third ; tarsi with very short mainly black hairs.

Wings with veins more or less strongly tinged brown or black, tip of marginal and submarginal cells and adjoining veins clouded brownish, a similar cloud extending down from the small blackish stigma to lower basal cross-vein ; brown wing markings sometimes more extensive. Squamae grey, with rather long whitish fringes. Halteres brown-stemmed, with a black knob.

FEMALE. Resembling male, except in the following respects :— Eyes rather narrowly separated ; the partially shining black frons lightly grey-dusted behind, more heavily greyish brown-dusted in front, with a pair of moderately-sized light brownish markings close against eyes shortly after middle ; entire frons with longish white hairs, but these distinctly shorter than the vertical hairs ; third tergite with long rufous hairs, black ones only present narrowly at base.

Holotype ♂. EAST NEPAL : Khumbu, Khumdzung, c. 12,700 ft., 11.vii.1962, (*G. Ebert, H. Falkner*).

Paratypes. 2 ♂, 1 ♀ with same data as holotype, except dates extending from 15.vi–18.vii.1962. Foregoing material in Zoologisches Sammlung des Bayerischen Staates. N.W. INDIA : Kashmir, Killanmarg, 10,500 ft., 26.vii.1931, 1 ♂ (*Fletcher* coll.). Brit. Mus. (Nat. Hist.).

This new species of *Volucella* bears a strong resemblance to *flavoscutellata*, described by Sack (1928 : 107) from Kumaon in North India. Both species with their densely pilose bodies belong to the *bombylans* group of *Volucella*, as do *ruficauda* and *lividiventris*, both described by Brunetti (1923 : 152) from Sikkim, *taiwana*, described by Shiraki (1930 : 215) from Formosa, and *bombylans* var. *malayana* described by Curran (1928 : 321) from Malaya. Typical *bombylans* has apparently not been recorded from the Oriental Region. The following key will suffice to distinguish the Oriental species of *Volucella* dealt with above.

1 Face reddish yellow : length, 16 mm. **bombylans** Linnaeus var. **malayana** Curran ♂ type only (not seen), ♀ unknown
– Face black, or at most (*flavoscutellata*) dark reddish towards sides 2
2 Third antennal segment orange yellow ; length 17 mm. **taiwana** Shiraki ♂ type only (not seen), ♀ unknown
– Third antennal segment at least partially darkened 3
3 Hair on disc of thorax grey ; length 15–16 mm. **lividiventris** Brunetti (not seen) .
– Hair on disc of thorax otherwise 4
4 Face (Text-fig. 4) deeply concave under antennae, then jutting forward conspicuously (as in *bombylans*), black centrally, dark reddish towards sides ; length (exclusive of antennae), 13 mm.; wing-length, 12 mm. **flavoscutellata** Sack ♀ type only, ♂ unknown
– Face only moderately hollowed under antennae, then descending rather flatly, entirely black 5
5 Third antennal segment scarcely one-and-a-half times as long as deep, reddish brown, with darker transverse band towards tip ; facial hairs mainly adpressed, blackish, longer on upper part, sometimes admixed with some brownish hairs ; thorax long rufous haired ; length (exclusive of antennae), 13–18 mm.; wing-length 12–16.5 mm. . . . . **ruficauda** Brunetti
– Third antennal segment quite twice as long as deep, entirely blackish grey ; facial hairs mainly adpressed, whitish, longer on upper part ; thorax with hairs long, mainly black, whitish only on about posterior one-sixth ; length (exclusive of antennae), 15–17 mm.; wing-length 14–16 mm. . . . . **varipila** sp. n.

Subfamily **SERICOMYIINAE**

***Pseudovolucella hingstoni* n. sp.**

(Text-fig. 7)

MALE. Length (exclusive of antennae), 15 mm. ; wing-length, 13·5 mm. Eyes in contact for less than one-sixth of distance from their anterior point of approximation to occiput. Frons very short, yellow-tomentose, with narrow central greyish line, long black hairs down middle, short reddish hairs at sides. Face flattish, descending well below eyes, yellow-tomentose except on the broad dull greyish antennal concavity, the shining reddish brown bare central prominence, and along the broad grey shining side-stripes. Eye-margins and sides of face with moderately long yellow hairs. Antennae with first and second segments shining black, third segment dark brown, somewhat reddish apically and below ; arista about twice length of third antennal segment, reddish, fringed with fine, close-set blackish hairs.

Thorax very slightly shining, greyish brown, with rather dense longish foxy red hairs, which become longer at sides and posteriorly. Scutellum rather duller greyish brown, becoming broadly yellowish orange along posterior margin with very long foxy red hairs dorsally and along posterior margin and rather close-set fringe of shortish curled yellow hairs below.

Abdomen blackish dorsally, with a narrow reddish orange slightly arched band on second, third and fourth tergites ; these tergites rather dull, fourth shining for rather more than apical half ; first and extreme base of second pale yellowish. The reddish orange band on second tergite at middle is equidistant from front and hind margins, sloping back to extend broadly over side-margins ; that on third tergite is more anteriorly placed throughout, likewise sloping back to extend broadly over side-margins ; that on fourth tergite is even more anteriorly placed on median line, sloping back without quite reaching side-margins ; tergites clothed on disc with rather short upright hairs, mainly following the ground-colour, and along sides with mainly yellow hairs, these becoming very long towards base of second tergite. Sternites orange, second, third and fourth broadly darkened along median line, all with long yellow hairs. Pregenital segment shining blackish brown, with long orange hairs.

Legs with all coxae and femora black, except latter rather broadly pale at tip, hind pair indistinctly so. Front tibiae darkened except broadly at base, front tarsi darkened. Mid tibiae and tarsi reddish yellow, except last three tarsal joints darkened. Hind tibiae very dark reddish, broadly black at middle, hind tarsi blackish. Hind femora (Text-fig. 7) greatly thickened (as is usual in males of this genus), only slightly convex above, and below with a blunt projection bearing about six long black bristly hairs just beyond middle and a second projection on apical third ; clothed anteriorly with long golden partly depressed hairs for about basal two-thirds, these becoming dorsal on about apical third.

Wings with greyish membrane ; stigma dark brownish, this colour extending downwards over anterior half of middle of wing to form a very distinct cloud. Squamae yellowish white with a fringe of long brownish black hairs. Halteres with pale orange stem and dark brown knob.

FEMALE. Length (exclusive of antennae), 14 mm. ; wing-length, 13 mm. Eyes broadly separated, the space between them widening almost from occiput down to their lowest extremity. Frons dark greyish brown on upper part with a rather broad yellow tomentose band just below middle, this band connected narrowly along eye-margins with the yellow facial tomentum, leaving a broad isolated chocolate-brown area reaching down to the orange and black lunula. Face with central prominence more shining than in ♂, and jowls slightly deeper.

Thoracic and scutellar hairs paler than in ♂.

Tergites with the reddish orange bands slightly deeper than in ♂, and that of fourth tergite extending broadly over side-margins as with two preceding tergites.

Hind femora only moderately and evenly thickened, not curved and without ventral projections ; rather evenly clothed with moderately long pale yellow hairs and with a ventral fringe of exceedingly long similarly coloured hairs extending along almost basal three-quarters, some of these quite twice as long as maximum depth of femora.

Holotype ♂. SIKKIM : Phadam Chen, 9,000 ft., 30.iii.1924 (*R. W. G. Hingston*). Everest Expedition.

Paratype. EAST NEPAL : Taplejung District, damp evergreen forest above Sangu, c. 9,200 ft., 26.xi.1961, 1 ♀.

Above material in Brit. Mus. (Nat. Hist.).

General characters conforming to the generic diagnosis of Shiraki (1930 : 39). Superficially resembling *fasciata* Curran (1931 : 369), the distinguishing characters are detailed in the following key to the seven species of *Pseudovolucella* now described from the Oriental Region.

1 Second tergite with one or two reddish brown or reddish orange bands, interrupted or not 2
– Second tergite without such bands 5
2 Second tergite with one such band 3
– Second tergite with two such bands 4
3 Four anterior legs reddish yellow, apart from last two tarsal joints darkened. Length (exclusive of antennae), 13–14 mm.; wing-length 12–13 mm. ♂ hind femora (Text-fig. 6) very strongly convex above, and with a single projection below on apical third . . . . ***fasciata*** Curran (Borneo)
– All coxae and femora black, latter broadly pale at tip ; front tibiae darkened except broadly at base ; front tarsi entirely darkened ; length (exclusive of antennae), 14–15 mm.; wing-length, 13–13.5 mm. ♂ hind femora only slightly convex above and with a projection just beyond middle besides the one on apical third ***hingstoni*** sp. n. (Sikkim, Nepal)
4 Hind femora strongly thickened ; arista with some forty dorsal bristles ; length, 14 mm. . . . . . ***apimima*** Hull ♂ type only (not seen), ♀ unknown (Java)
– ♂ hind femora less strongly thickened. ♂ ♀ arista with some twenty-four bristles ; length, 13 mm. . . . . ***mimica*** Shiraki (not seen) (Formosa)
5 Frons with yellowish pile ; tergites brownish orange ; length (exclusive of antennae), 14–15.5 mm.; wing-length, 13–14.5 mm. ***malayana*** Curran ♂ only, ♀ unknown (Malaya)
– Frons with black pile 6
6 Tergites brownish ; length, 14 mm.; wing-length, 12 mm. ***apiformis*** de Meijere ♂ type only (not seen), ♀ unknown (Sumatra)
– First tergite, and slightly more than basal half of second, brownish yellow, remaining tergites black ; length (exclusive of antennae), 14 mm.; wing-length, 13 mm. ***ochracea*** Hull ♂ type only, ♀ unknown (Burma)

Subfamily **CERIOIDINAE**

Ceria obscura Brunetti

Ceria obscura Brunetti, 1908 : 94.

EAST NEPAL : Bi Khola, c. 7,500–c. 8,850 ft., 13.v.1962, 1 ♂ (*G. Ebert, H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

Described from SIKKIM. Type in Zoological Survey Museum, Calcutta. Series in Brit. Mus. (Nat. Hist.).

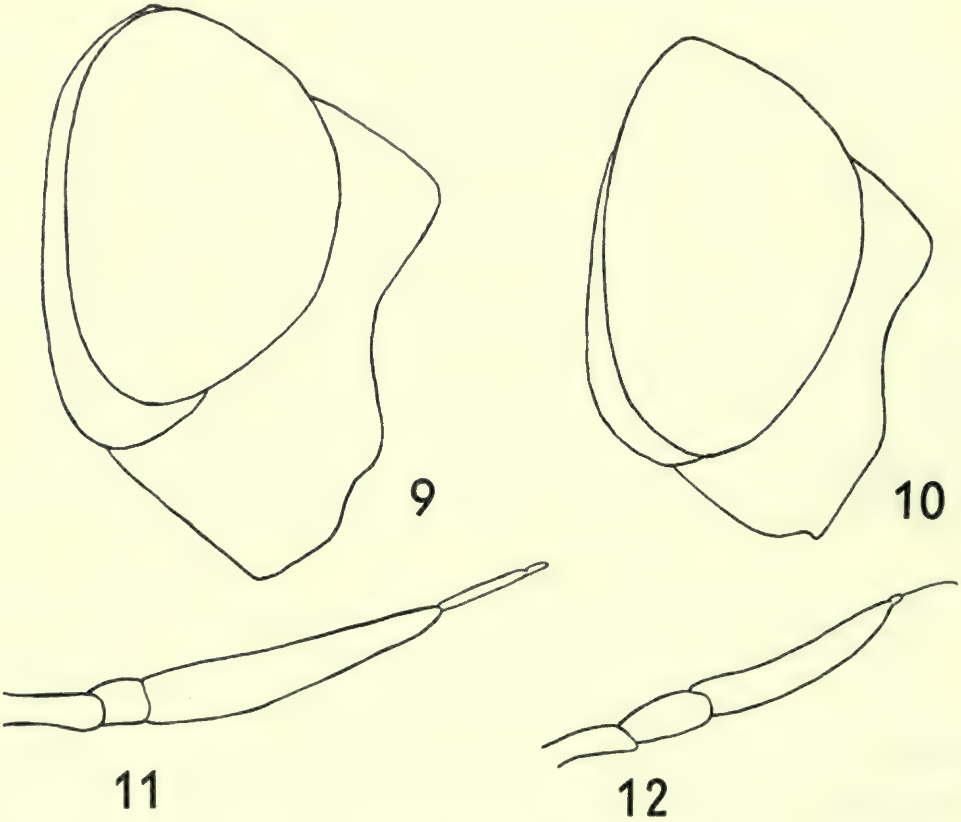
Subfamily **ERISTALINAE**

Eristalis himalayensis Brunetti

(Text-fig. 9)

Eristalis himalayensis Brunetti, 1908 : 70 (nom. nov. pro. *ursinus* Bigot, 1880 : 215, nec Jaennicke, 1867 : 401).

East Nepal : Taplejung District, from damp evergreen oak forest above Sangu, c. 9,200 ft., 2–26.xi.1961, 2 ♂, 2 ♀ ; also from edge of mixed forest above Sangu, c. 6,500 ft., 17.x–1.xi.1961, 1 ♀ ; Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 2 ♀ ; and from mixed vegetation by stream in gully, xi.1961–i.1962, 1 ♀. Brit. Mus. (Nat. Hist.). East of Katmandu, Dudh Kosi Tal, c. 980 ft., 24.vii.1962, 1 ♂ (*G. Ebert*, *H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.



Figs. 9–12. 9, 10, heads of ♂ *Eristalis* in profile. (9) *himalayensis* Brunetti. (10) *brevifacies* sp. n. 11, 12, antennae of ♀ *Callicera*, interno-lateral view. (11) *robusta* sp. n. (12) *sumatrensis* de Miejere.

Occurs also in NORTHERN INDIA, KASHMIR, SIKKIM and BURMA.

The small group of Oriental representatives of the "plain-eyed" *Eristalis* to which *himalayensis* belongs is characterised by the contrasting paleness of the first abdominal tergite with the blackish succeeding tergites. Bigot's *albibasis* (1880 : 215), of which I have not seen the single ♀ described, is represented in the Brit. Mus. (Nat. Hist.) by a teneral ♂ of *himalayensis* in which the dark brown clouding of the wing is completely absent. Brunetti (1923 : 170) states that the sole example described by Bigot is in the Indian Museum (now the Zoological Survey of India), and bears the data :— "Simla, 7,000 ft., 16.v.1909 (Annandale)". He remarks that it bears a considerable resemblance to *himalayensis*, but is easily separated by the clear wings, greater depth of epistoma below the eyes, and by minor characters. I am inclined to believe that the type will be found to represent a teneral example of *himalayensis*. It cannot be *brevifacies* (described below), as in the latter a clear distinction from *himalayensis* (Text-fig. 9) exists in the *lesser* depth of epistoma below the eyes.

Eristalis brevifacies sp. n.

(Text-fig. 10)

MALE. Length (exclusive of antennae), 13–16 mm. ; wing-length, 11–13 mm. Eyes in contact for nearly twice length of vertex ; eye-hairs mainly dense and moderately long, dark brown above, pale yellow below, some of the latter very long and scattered towards ventral margin ; a central band of black hairs extends down from the vertex almost to the ventral margin. Vertex small, dull black, with long black hairs. Frons slightly bulbous, dulled by dense yellowish grey dusting except where the shining black ground-colour is exposed on the median line immediately above the shining orange lunule, long black haired. Face (Text-fig. 10) moderately hollowed beneath the antennae, then only slightly projecting, central knob inconspicuous ; descending only shortly below eye-level, lightly grey-dusted, with a short almost linear bare shining median stripe extending over the flattish part down to the lightly dusted, broadly shining central knob, clothed with moderately long pale yellow hairs which become longer at sides towards upper mouth edge and against the narrow whitish eye-margins. Antennae with first and second segments short, shining black, third hardly longer than first and second together, dull brownish black, narrowly red at base, at least on outer surface. Arista about twice the length of third antennal segment, moderately long plumose, light reddish brown.

Thorax black with bluish reflections, slightly shining on disc along approximately anterior quarter, moderately shining along remainder, finely and inconspicuously punctate, broadly greyish along line of suture, hair uniformly light tawny ; scutellum dull yellowish, with light tawny hairs. Pleurae dull grey, with long yellowish hairs.

Abdomen with first tergite entirely yellowish grey with long pale yellow hairs ; second tergite narrowly yellowish grey at base, otherwise moderately shining black with large yellowish side-spots extending from anterior margin to not far short of posterior margin, widest at middle where each occupies about a quarter of width of tergite, hairs following ground-colour, rather long ; third and fourth tergites moderately shining black, entirely covered with rather long black hairs, and both with a brightly shining black band just after middle. Sternites grey-green with long pale yellow hairs. Pregenital segment black, brightly shining, with sparse rather short black hairs.

Coxae and trochanters black, grey-dusted, yellow-haired. Hind femora only slightly thickened, black, narrowly yellow-tipped, two anterior pairs rather broadly yellow-tipped (less so behind) ; anterior pair with mainly black hairs ventrally, and posteriorly with an abundant covering of black and yellow hairs, the latter mainly confined to base, all hairs becoming longer towards base and those placed postero-dorsally forming a fringe ; mid pair similarly clothed, but ventrally there are some very long isolated yellow hairs on more than basal third ; hind pair with a similar fringe to the anterior pairs, but it is placed antero-dorsally ; ventrally, besides a row of very short black hairs along the apical half, there are some very long isolated mainly yellow hairs, placed principally in two rows, antero-ventral and postero-ventral. Four anterior tibiae yellow on basal half, blackish grey on apical half, front pair with mixed short black and pale yellow hairs, mid pair predominantly short pale-haired ; hind tibiae laterally flattened, moderately curved, black except obscurely yellowish towards base, clothed with mainly short, predominantly black hairs. Front tarsi dark grey, mid pair yellow with last joint darkened, hind pair with metatarsus dark grey, reddish towards tip, second, third and fourth joints yellow, fifth darkened.

Wings with clear membrane, apart from a dark brownish clouding spreading down from the blackish stigma over anterior half of middle of wing. Squamae greyish brown, with moderately long pale yellow fringe. Halteres with yellowish stem and greyish knob.

FEMALE. Eyes broadly separated, the space between them widening almost from occiput down to their lowest extremity. Frons dull black with a cross-band of grey dusting about halfway between front ocellus and base of antennae, and a similar but indefinite area just above frontal lunule, hairs long, blackish. Third antennal segment larger than in ♂, quite one and a half times as long as first and second together (inside measurement). Otherwise resembling ♂.

Holotype ♂. EAST NEPAL : Taplejung District, between Sangu and Tamrang, from mixed shrubs in deep gorge, c. 5,200 ft., x–xi.1961. Brit. Mus. (Nat. Hist.).

Paratypes. N.E. INDIA : Assam, Nyukmadong, 6,600 ft., 1–6.viii.1961, 2 ♀ (*F. Schmid*). In Basel Museum Collection. Naini Hills, 7–8,000 ft., 11–14.v.1927, 3 ♂, 1 ♀ (collector unknown). N.W. INDIA, Kashmir, Gulmarg, 8,500 ft., summer 1913, 1 ♀ (*F. W. Thomson*). Brit. Mus. (Nat. Hist.).

Superficially resembling *himalayensis* (see above), but in both sexes clearly distinguished by the less descending face with much narrower, almost linear, bare shining black median stripe, four anterior femora fringed behind with mainly black, instead of entirely yellow, hairs, hind femora without the dense antero-ventral fringe of longish dark brown and black hairs which is present in *himalayensis*. The thorax is evenly and finely punctate, whereas in *himalayensis* it has numerous small dark punctations on disc, these finer on anterior half, noticeably coarse on a median shining grey area beyond middle. In ♂ the eyes touch for nearly twice the length of vertex in *brevifacies*, and in *himalayensis* for about length of vertex. Finally, *himalayensis* has a larger size range than *brevifacies*, varying from 15–18 mm. in length and from 13–15 mm. in wing-length.

Eristalis simplicipes Curran

Eristalis simplicipes Curran, 1928 : 300.

EAST NEPAL : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 1 ♀.

Curran described this handsome species from 5 ♂ and 1 ♀ taken by H. M. Pendlebury in Malaya. This series is in Brit. Mus. (Nat. Hist.). The single ♀ described by Curran and labelled " allotype " differs from his series of males in having no yellow or reddish yellow markings on the third, fourth and fifth tergites.

My ♀ example, however, agrees with the ♂ in this respect. It differs, on the other hand, from all of Curran's material in having the large yellow or reddish yellow paired markings on the second tergite almost wholly pale yellow-haired, only a restricted area at the sides being black-haired. In Curran's examples that tergite is wholly black-haired.

Eristalis cerealis Fabricius

Eristalis cerealis Fabricius, 1805 : 232.

East Nepal : Taplejung District, above Sangu, c. 6,500 ft., 17.x–1.xi.1961, 3 ♂, 2 ♀ ; also Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, series ♂ ; from rotting fruits of Bhor tree on ground, 7–31.x.1961, 1 ♀ ; by rocky stream, 7–16.x.1961, 1 ♀ ; and from mixed vegetation by stream in gully, ix.1961–i.1962, series ♂ ♀. E. Nepal : Arun Valley, Tumlingtar, plateau, c. 2,000 ft., from blooms of *Guizotia abyssinica* Cassini, 10–16.xii.1961, 1 ♂.

Examples in Brit. Mus. (Nat. Hist.) from China, Japan, Kashmir and India.

Eristalis paria (Bigot)

Eristalomyia paria Bigot, 1880 : 218.

East Nepal : Taplejung District, edge of mixed forest above Sangu, c. 6,500 ft., 17.x–1.xi.1961, 1 ♂ ; Sangu, 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 1 ♂ ; from mixed vegetation by stream in gully, ix–x.1961, 1 ♀ ; and by rocky stream, 7–16.x.1961, 1 ♀. In Brit. Mus. (Nat. Hist.).

East Nepal : Katmandu, c. 4,580 ft., 16.iv.1962, 2 ♀ ; E. of Katmandu, Dudh Kosi Tal, c. 9,170 ft., 9.vi.1962, 1 ♀ ; Thodung, 10,120 ft., 1.vi.1962, 1 ♀ (*G. Ebert, H. Falkner*), in Zoologisches Sammlung des Bayerischen Staates.

Widespread in India. Also recorded from Java and Laos.

Eristalis ocularia Coquillett

Eristalis ocularius Coquillett, 1898 : 325.
Eristalis laetus Brunetti, 1923 : 165, nec Wiedemann, 1830 : 192.

East Nepal : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 2 ♀.

Described from Japan, this species is represented in the Brit. Mus. (Nat. Hist.) by an example from that country and by others from North East India and China.

Eristalis arvorum (Fabricius)

Syrphus arvorum Fabricius, 1787 : 335.
Eristalis arvorum (Fabricius) de Meijere, 1908 : 247.

East Nepal : Taplejung Dstrict, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 1 ♀ ; and Arun Valley, below Tumlingtar, River Sabhaya, west shore, c. 1,800 ft., resting on tent, 30.xii.1961, 1 ♀. In Brit. Mus. (Nat. Hist.).

EAST NEPAL : S. of Katmandu, Hitora, Rapti Tal, c. 980 ft., 23–27.iii.1962, 5 ♀ (*G. Ebert, H. Falkner*). In the Zoologisches Sammlung des Bayerischen Staates.

Widespread in Oriental Region, also recorded from CHINA, JAPAN and QUEENSLAND.

Eristalis obscuritarsis de Meijere

Eristalis obscuritarsis de Meijere, 1908 : 250.

EAST NEPAL : Taplejung District, Sangu, 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 2 ♂, 1 ♀.

Widespread in INDIA, also recorded from JAVA, SUMATRA and the PHILIPPINES.

Eristalis quadristriatus Macquart

Eristalis quadristriata Macquart, 1846 : 127.

EAST NEPAL : Taplejung District, Sangu, 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 5 ♂, 1 ♀.

Recorded from FORMOSA and the PHILIPPINES.

Represented in the Brit. Mus. (Nat. Hist.) collection by a single ♀ labelled " ex Bigot Coll. Pres. by G. H. Verrall. B.M. 1894–234 ". I am satisfied that my above series from Nepal is the same species. There is a dark spot at *both* extremities of the stigma in all the material, an unusual feature in the genus.

Eristalis tenax (Linnaeus)

Musca tenax Linnaeus, 1758 : 591.
Eristalis tenax (Linnaeus) Verral, 1901 : 505.

EAST NEPAL : Taplejung District, from edge of mixed forest above Sangu, c. 6,200 ft., 17.x–1.xi. 1961, 1 ♀ ; also on old stone wall above Sangu, c. 7,000 ft., 7.i.1962, 1 ♂, 1 ♀ ; Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 1 ♀ ; and Arun Valley, Tumlingtar, plateau, c. 2,000 ft., from blooms as above, 10–16.xii.1961, 5 ♂, 1 ♀. In Brit. Mus. (Nat. Hist.).

EAST NEPAL : E. of Katmandu, Dudh Kosi Tal, Hitora, c. 3,500 ft., 24.vii.1962, 1 ♀. (*G. Ebert, H. Falkner.*) In the Zoologisches Sammlung des Bayerischen Staates.

E. tenax is common in most parts of the world.

Eristalis multifarius Walker

Eristalis multifarius Walker, 1852 : 248.
Eristalis circularis Curran, 1930 : 333. **Syn. n.**
Merodonoides minutus Hull, 1944 : 43. **Syn. n.**

EAST NEPAL : Taplejung District, Dobhan, from cut rice steppes above River Maewa, c. 4,000 ft., 28.i.1962, 1 ♀.

Recorded from INDIA, CEYLON and MALAYA.

Curran (1930 : 333) created the genus *Merodonoides* with *circularis* Curran (idem) as type-species, separating it from *Eristaloides* Rondani (1844 : 453) on the basis of its bare eyes and considerably enlarged hind femora. Hull (1949 : 397) sank *Merodonoides*, *Eristaloides*, and a number of other so-called genera under *Eristalis*, considering their characters to be of only minor group value. I agree entirely with Hull's move in this matter.

I have examined the male holotype of *circularis* Curran, 1930, and find that it is identical with *multifarius* Walker and therefore becomes a synonym of the latter species. Hull (1949 : 397) gave *circularis* Curran as a synonym of *Helophilus singularis* Walker (1856 : 17), originally described as an *Eristalis*. Hull is incorrect here, as *singularis* is a true Helophilini with its widely open marginal cell. Hull's *Merodonoides minutus* (1944 : 43) **(syn. n.)** of which the male holotype is in the Brit. Mus. (Nat. Hist.) is only a pale variety of *multifarius*.

Megaspis zonata (Fabricius)

Syrphus zonatus Fabricius, 1787 : 337.
Megaspis zonatus (*zonalis*) (Fabricius) de Meijere, 1908 : 240.

EAST NEPAL : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 4 ♂, 1 ♀ ; also from edge of mixed forest above Sangu, c. 6,500 ft., 17.x–1.xi.1961, 1 ♀ ; and Dobhan, east bank of River Tamur, c. 3,500 ft., from mixed vegetation by stream in deep gully, i–ii.1962, 2 ♂, 1 ♀.

Common throughout the Oriental Region, also recorded from CHINA and JAPAN.

Megaspis errans (Fabricius)

Syrphus errans Fabricius, 1787 : 337.
Megaspis errans (Fabricius) de Meijere, 1908 : 240.

EAST NEPAL : Taplejung District, Sangu, c. 6,200 ft., from blooms of *Guizotia abyssinica* Cassini, 16–29.x.1961, 1 ♂, 1 ♀ ; and Arun Valley, Tumlingtar, plateau c. 2,000 ft., from blooms as above, 8–25.xii.1961, 4 ♂, 4 ♀.

Common throughout the Oriental Region, also recorded from CHINA and JAPAN.

Subfamily **XYLOTINAE**

Xylota dimidiata Brunetti

Xylota dimidiata Brunetti, 1923 : 232.

EAST NEPAL : E. of Katmandu, Dudh Kosi Tal, c. 9,170 ft., 9.i.1962, 2 ♀ (*G. Ebert*, *H. Falkner*). In Zoologisches Sammlung des Bayerischen Staates.

This striking species with its brown cloud over the apical part of the wings and reddish legs was described from NORTH INDIA from a single ♀. The latter is in the Brit. Mus. (Nat. Hist.), together with a series of 5 ♂ and 3 ♀ collected in the Naini Hills, NORTH INDIA (*R. C. Jermyn*). Brunetti's type ♀ has the face almost entirely orange-yellow, but two of Jermyn's females have it entirely black, while his remaining one has the upper part black and the lower part orange-yellow. In the apparently undescribed male, the ground colour of the face from the front view is completely hidden by dense whitish dusting, but by tilting the specimen backwards and viewing the face from beneath the latter is seen to be yellow on more than the lower two-thirds. The male differs principally from the female in the following respects :—Eyes touching briefly for a distance about equal to length of the vertical triangle ; frons, including frontal prominence but excluding the orange-yellow lunule, heavily white-dusted ; abdomen narrower, hour-glass shaped, i.e., second tergite narrowing to tip, third tergite narrowing to base.

Xylota makiana (Shiraki)

Zelima makiana Shiraki, 1930 : 65 (*Xylota*).

INDIA : Assam, Nyukmadong, 6,600–8,000 ft., 1–6.viii.1961, ♂ (*F. Schmid*). In Naturhistorisches Museum, Basel, Switzerland.

Described from 1 ♂ and 2 ♀ taken in FORMOSA, this species is characterized in the male by the extraordinarily long and handsome anterior and posterior fringes of pale yellow hairs on the mid tibiae. The present record is of considerable geographical interest.

Criorhina bomboides Hull

Criorhina bomboides Hull, 1944 : 37.

SIKKIM : Kecholperi, 5,900 ft., 9.iv.1959, 1 ♂ (*F. Schmid*). In Naturhistorisches Museum, Basel, Switzerland.

Described from a single male taken at Shillong in ASSAM. Schmid's specimen appears to be the second record of this species.

Criorhina crioarctos Hull

Criorhina crioarctos Hull, 1944 : 36.

Described from a single female taken in Burma in 1896 by Lt.-Col. Bingham. I describe below the hitherto unknown male.

MALE. Length (exclusive of antennae), 14 mm. ; wing-length, 13 mm. Eyes bare, narrowly dichoptic. Vertex dull brownish black, with rather sparse long black hairs behind and shorter greyish ones in front, all proclinate. Frons furrowed shortly after front ocellus, followed by a curious raised lunule, these parts brownish, remainder of frons and the short frontal prominence shining black, with the exception of the brownish lunula ; whole frons bare. Face moderately broad, slightly more descending than in female ; similarly almost straight in profile, but the mahogany-red colour restricted to sides, otherwise covered densely with yellowish grey dusting, apart from a narrow median streak of exposed blackish ground colour for almost entire length ; some longish grey hairs present close to eye-margins and on jowls, face otherwise bare. Antennae short, reddish brown, first segment slightly longer than second, third segment short, about twice as deep as long, angular above, rounded below ; arista fairly long, reddish brown.

Thorax with bronzy green slightly shining ground colour, a narrow median dull black stripe between a pair of similarly coloured much broader ones distinctly seen ; wholly covered with abundant rather long brownish black hair, which becomes longer towards sides and posteriorly. Scutellum bronzy green, slightly shining, with very long abundant brownish black hair. Pleurae with similar hair.

Abdomen with second tergite slightly shining bronzy green, a dense brush of long rufous hairs present laterally, otherwise with long brownish black hairs ; third tergite similarly coloured, with long brownish black hairs only ; fourth tergite shining blackish, with a pair of large dull pale yellow spots towards sides, a narrow brush of long rufous hairs present laterally, tergite otherwise with long brownish black hairs ; fifth segment moderately shining black with long grey-black hairs. Sternites shining brownish.

Legs brownish orange, except front tarsi with metatarsus darkened above and at tip and other four joints completely darkened, four remaining tarsi with last two joints darkened. Four anterior femora with long brownish black hair, becoming longer towards base, hind pair similarly clothed for rather more than basal half, then golden haired ; tibiae and tarsi mainly with short golden hairs. Hind femora somewhat thickened.

Wings with membrane strongly yellow-tinged, a brownish cloud present towards tip over about anterior half and a small isolated darker spot below it ; veins yellowish on more than basal two-thirds of wing, otherwise blackish. Squamae smoky grey with long brownish black fringes. Halteres with light yellowish brown stem and brownish black knob.

INDIA : Assam, Bondi La, 8,800 ft., 29.iv.1961, 1 ♂ (*F. Schmid*). In Naturhistorisches Museum, Basel, Switzerland.

Criorhina tripilosa sp. n.

FEMALE. Length (exclusive of antennae, but to tip of epistoma), 17 mm. ; wing-length, 15 mm. Eyes well separated, the space between them widening from level of front ocellus down to their lowest extremity, bare. Vertex shining black, with close-set blackish hairs anteriorly, and some scattered longer ones behind. Frons shining black, with a pair of small narrow pale yellowish brown dust-spots against eyes, frontal prominence and lunula clear orange-yellow, bare, the remainder of frons with close-set short brownish black hairs. Face moderately broad, considerably hollowed under antennae, then steadily jutting forward to upper mouth-edge ; descending obliquely well below lowest level of eyes, shining black, narrowly banded with greyish brown dusting immediately below base of antennae and with irregular greyish brown dusting against eye-margins down to jowlar margins ; central prominence small, oblong, clearly protruding. Antennae yellowish, first and second segments moderately long, first somewhat longer than second, third about one and a half times as deep as long, darkened above and at tip, arista missing. Occiput rather flattish, the grey ground colour totally obscured against eyes by heavy grey-brown dusting. Thorax shining black and practically undusted behind suture, anterior of this mainly obscured by yellowish grey dusting which on disc vaguely forms two pairs of stripes ; closely covered with short black hairs. Pleurae heavily dusted yellowish grey, with abundant long shaggy black hairs. Scutellum with ground colour obscured by yellowish grey dusting, slightly shining, densely covered with very long shaggy yellow hair.

Abdomen with second tergite with minute blackish hair-punctures, ground colour obscured by heavy pale greenish grey dusting, covered by long shaggy yellow hair except along the hind-margin where the dusting becomes darker and the covering hairs rufous ; third tergite with the shining greenish black ground colour exposed anteriorly towards sides and along a short narrow median stripe, otherwise dully shagreened on about anterior half and heavily covered with greenish grey dusting posteriorly ; some vague reddish markings can be traced towards sides and rather short rufous hairs cover the whole tergite ; fourth tergite similarly with the shining greenish black ground colour exposed anteriorly towards sides and along a more extended and broader median stripe, otherwise in the single female examined shagreened on the left of the tergite and heavily yellowish grey dusted with minute black hair-punctures on the right portion, the entire tergite covered with rather long rufous hairs ; fifth tergite similar to the fourth.

Legs with coxae dull grey-black, trochanters shining reddish ; four anterior femora shining black on more than basal half, then more or less obscurely streaked dark reddish and clear yellowish orange at tips, with mainly short blackish hairs beneath and longer more abundant similar hairs behind ; hind femora much thickened and slightly curved, similarly coloured to the preceding pairs and abundantly and completely covered with mainly long blackish hairs which are obviously more closely set towards the apex. Four anterior tibiae reddish orange with dark streaks after middle, mainly short brown- and black-haired ; hind tibiae thickened about middle, constricted and flattened on inner side on about apical third, reddish orange, darker along thickened part, where the mainly short brownish hairs are supplemented by longer black ones. Tarsi with first three joints orange, remaining two greyish black, all with very short mainly light brownish hair.

Wings with the greyish membrane extensively tinged brownish, particularly obviously so towards the fore-margin ; from the dark brown stigma a similarly coloured cloud spreads downward to almost reach discal cross-vein, and the subapical cell and upper basal cell each have a considerable whitish area. Squamae brownish grey, with a dense fringe of rather long golden hairs. Halteres brownish stalked with darker brown knob.

Holotype ♀. INDIA : Kumaon, Barasu, 5,000–6,000 ft., 5.v.1958 (*F. Schmid*). In Naturhistorisches Museum, Basel, Switzerland.

This handsome species appears to be related to *pallipilosa* Hull (1944 : 34), described originally from a series of four males. Later Hull (1950 : 610) described the female of *pallipilosa* from a single specimen. All the material described is in the Brit. Mus. Nat. Hist.) and bears the following data, " Kashmir : Gulmarg, 8,500 ft., summer 1913 (Lt.-Col. F. W. Thomson) ". A striking sexual dimorphism in *pallipilosa* is that in the male the entire frons and the face apart from the sides is densely covered with pale brownish yellow extremely minute pubescence, whereas in the female the frons is partially shining black and the face is shining blackish brown or brown apart from a narrow band of greyish or pale yellowish dusting immediately under the base of the antennae. Described from the female only is the subspecies *bicolorata* Hull (1950 : 610) of *pallipilosa* (which differs from the typical examples in the colour of the abdominal pile) and a third related species, *rubropilosa* Hull (1950 : 608). These females all have the face shining black, blackish brown or brown, without dusting apart from the narrow band of greyish or pale yellowish dusting immediately under the base of the antennae.

The striking and clearly differentiated sequence of black, yellow and orange in the coloration of the body-pile of *tripilosa* contrasts most obviously with the predominantly grey body-pile of *pallipilosa* and its subspecies *bicolorata* and of *rubropilosa*, apart from the considerably more thickened hind femora of *tripilosa* with their very dense long black hairs.

(*Note*:—While it was hoped to include a specific key to the numerous species of Oriental *Criorhina* in the present paper, this has proved impracticable because less than half the described species are in the Brit. Mus. (Nat. Hist.), and of the others some cannot be made available for study, and many descriptions omit to mention characters that would be of vital importance in a key.)

Lycastris austeni Brunetti

Lycastris austeni Brunetti, 1923 : 279.

Brunetti described this handsome species from a male and female taken in NORTH EAST INDIA, Darjeeling, 6,000 ft., 26.iii.1894, ♂ ; 7,000 ft., v.1894, ♀ (*C. T. Bingham*). Both examples are in the Brit. Mus. (Nat. Hist.).

The long shaggy body pubescence resembles that of *Volucella bombylans* Linnaeus, the yellowish hairs on the basal tergites being succeeded in turn by black and then reddish hairs. This species and *griseipennis* sp. n., described below, are much larger than the three other species known in the genus. The length (exclusive of snout and antennae) of *austeni* is 17 mm., and the wing-length 16 mm.

Lycastris griseipennis sp. n.

MALE. Length (exclusive of snout and antennae), 16 mm.; wing-length, 15 mm. Superficially resembling *austeni*, but most obviously distinguished by the almost uniformly greyish wings with only slight clouding on cross-veins.

Eyes in contact for not more than the distance between their posterior point of approximation and the anterior ocellus. Snout projecting for about three times the length of frons, but this may be variable as in some other species of the genus. Both snout and frons are dark brown to blackish, shining, base and sides of the frons with some pale yellow dusting, and a continuous line of similar dusting extending narrowly along the extreme lateral margin of the frons and continuing broadly along the sides of the snout for practically its entire length. Antennae and arista brownish.

Thorax blackish brown, only slightly shining, with rather long dark reddish brown hairs, these more blackish towards the sides and on the reddish brown humeri. Scutellum with dark greenish ground colour, clothed with long shaggy yellowish hairs.

Abdominal tergites with similar ground-colour, second tergite with long shaggy sub-depressed yellowish hairs obscuring ground-colour and extending over basal part of third tergite. The hairs on apical part of latter and on fourth tergite and pre-genital segment are foxy red (in ♂ paratype these become dark grey on pre-genital segment).

Legs with coxae and trochanters black or dark brown; front and mid femora brownish red for about basal half, then pale yellow, fringed mainly with long brownish hairs, these being replaced by pale yellow hairs shortly after middle; hind femora moderately thickened, brownish red, broadly yellow-tipped, the long brownish fringe extending almost to tip, then replaced by pale yellow hairs; front tibiae pale yellowish, vaguely darkened at extreme tip, mid pair entirely pale yellowish, both pairs fringed for entire length with long pale yellow hairs; hind pair pale yellowish for almost basal half, then brownish red, the long pale yellow fringe of hairs on basal half admixed with brownish hairs on apical portion; front and hind tarsi entirely brownish black, with very short brown and black hairs; mid metatarsi pale yellow with extreme tip darkened, fringed mainly postero-ventrally with long pale yellowish hairs for about basal three-quarters, then with shorter dark brown hairs, which continue along remaining four tarsal segments, which are blackish.

Wings evenly greyish, with clouding on cross-veins. Squamae greyish with fringe of rather long yellow hairs. Halteres pale-stalked with brown or black knob.

Holotype ♂. NORTH EAST INDIA: Assam, Mishmi Hills, Delai Valley, Cha Che, 5,320 ft., 17.xi.1936 (*M. Steele*).

Paratype. 1 ♂ with same data as holotype.

The above material is in Brit. Mus. (Nat. Hist.).

The distinctive characters of this species are detailed in the key on p. 284.

Lycastris albipes Walker

Lycastris albipes Walker, 1857 : 155.

Walker described *albipes* from a teneral female in the W. W. Saunders collection, its sole data being "India". Brunetti (1908 : 85) described as new *Lycastris* *flavohirta* from two males taken by him at Darjeeling on 10–15.ix.1905 (Type) and on 25.ix.1906 (Paratype). Later (1923 : 279) he sank *flavohirta* as a synonym of *albipes*. His action in thus combining two such well defined species can be understood because he had at that time only Walker's teneral female type of *albipes* to compare with *flavohirta*.

Identical with *albipes* is *Lycastris* (*Xyphopheromyia*) *glossata* Bigot (1892 : 161), which is represented in the Brit. Mus. (Nat. Hist.) by the two male co-types from Sabatoo, INDIA. I describe below for the first time the true male of *albipes*, and necessarily redescribe the female, which Walker, as already stated, described from a teneral female.

MALE. Length (exclusive of snout and antennae), 11·5–14·5 mm. ; wing-length, 11–14 mm. Eyes in contact for not more than the distance between their posterior point of approximation and the anterior ocellus. Snout projecting for about three to three and a half times the length of frons. Both are dark brown to blackish, shining, base and sides of the frons with pale yellow dusting, which has a tendency to spread across middle towards base and continues broadly along the sides of the snout for more than its basal half. Vertex with long yellow hairs, these becoming longer behind. Antennae and arista pale brownish.

Mesonotum with shining greenish black ground colour, obscured by yellowish grey dusting and with a pair of closely applied dull greenish grey median longitudinal stripes clearly visible at least anteriorly ; clothed with rather abundant yellowish hairs, these moderately long on disc, longer towards sides and posteriorly. Scutellum clear yellowish with rather abundant long yellowish hairs.

Abdomen broadest at apex of second segment, then considerably narrowing to tip. Tergites shining greenish black, except first tergite pale basally and on disc, second and third more or less pale at extreme base ; hairs moderately abundant, rather long pale yellowish, longer at sides and forming an adpressed fringe along posterior margins of second, third and fourth tergites. Pre-genital segment shining brownish black with rather sparse and long brownish black hairs.

Legs with coxae and trochanters greenish black, more or less distinctly grey dusted ; front femora moderately thickened, ventrally with a rather triangular short blackish projection shortly before middle ; hind femora considerably swollen, obviously convex above ; front and mid pairs black for more than basal half, then yellow, hind pair almost all black, narrowly yellow only at extreme tip ; all femora with rather long, mainly yellowish white hairs. Front and mid tibiae pale lemon-yellow with fringe of whitish yellow hairs, these much longer on mid pair ; hind tibiae black for at least basal three-quarters, remainder reddish yellow, the whitish yellow hairs of varying lengths and variously directed. Front metatarsi clear yellow, more or less extensively brownish towards tip, remaining four segments brownish black ; mid tarsi mainly clear yellow, only two apical segments darkened ; hind tarsi entirely brownish black ; hairs on all tarsi mainly short, whitish yellow, only mid pair with rather longer similar hairs ventrally and posteriorly.

Wings greyish, with clouding on cross-veins and at tip. Squamae whitish grey, with fringe of long yellow hairs. Halteres pale-stalked with light brownish knob.

FEMALE. Length (exclusive of snout and antennae), 12–14 mm. ; wing-length, 11–13·5 mm. Resembling ♂ in general appearance, differing as follows. Eyes widely separated, becoming increasingly divergent from level of front ocellus to base of projecting portion of frons. The vertex and upper (flat) part of frons are greenish black, moderately shining centrally, heavily and broadly yellow-dusted below front ocellus and along sides of frons, also along a very narrow central strip which extends to base of projecting portion of frons, clothed with long yellow hairs, these becoming longer behind.

Abdomen very rotund, broadest at apex of second segment.

Legs with front femora simple, lacking the ventral projection that is present in ♂, hind femora not convex above.

INDIA : Simla, 7,000 ft., x.1945, 2 ♂, 2 ♀ (*T. Jermyn*) ; Sabatoo (ex Bigot coll.), 2 ♂ (co-types of *glossata*) ; ex W. W. Saunders coll., 1 ♀ (Type of *albipes*). In Brit. Mus. (Nat. Hist.).

Lycastris flavohirta Brunetti

Lycastris flavohirta Brunetti, 1908 : 85.

Brunetti described *flavohirta* from two males, and subsequently sank the species under *albipes* (see latter for details). My recent capture in East Nepal of a single female of *Lycastris* led me to study the genus, with the result that I find *flavohirta* to be an undoubtedly distinct species, of which my Nepalese specimen is the hitherto undescribed female. A redescription of the male and description of the female follows.

MALE. Length (exclusive of snout and antennae), 11–12 mm. ; wing-length, 10–11 mm. Eyes in approximation for not more than distance between hind ocelli and front ocellus. Snout projecting for about three to three and a half times the length of frons ; both are dark brown to blackish, shining, base and sides of the frons with pale yellow dusting, which tends to spread across middle towards base, and continues broadly along the sides of the snout for more than its basal half. Vertex with long brown hairs, becoming longer behind. Antennae with first and second segments blackish brown, third segment and arista reddish brown.

Mesonotum with shining greenish black ground colour, obscured by greyish white dusting, with a pair of closely applied dull greenish grey median longitudinal stripes, clearly visible at least anteriorly ; clothed with rather abundant greyish hairs, moderately long on disc, longer towards sides and posteriorly, sometimes admixed with darker hairs. Scutellum dark yellow to greenish, with long rather abundant greyish hairs, sometimes admixed with darker hairs.

Abdomen broadest at apex of second segment, then narrowing moderately to tip. First tergite grey at sides, shining black on disc ; second reddish orange apically, greenish black basally, this darkening sometimes spreading across tergite so that only a more or less narrow reddish orange strip remains along the posterior margin ; third and fourth tergites and pregenital segment reddish orange or orange, the only darkening being a more or less distinct narrow black median longitudinal stripe on third tergite anteriorly ; hairs on tergites moderately abundant, rather long, pale yellowish, sometimes admixed with grey, longer at sides and forming an adpressed fringe along posterior margins of second, third and fourth tergites.

Legs with coxae and trochanters black or dark reddish brown, grey-dusted. All femora simple, only hind pair moderately thickened ; front pair mainly clear yellow, only slightly more than basal third black ; mid pair clear yellow on apical half, basal half black ; hind pair clear yellow on about apical third only, basal two-thirds black. Front and mid tibiae entirely clear yellow, hind pair darkened on apical third or less. All femora and tibiae fringed with long pale yellow hairs, these longer on mid and hind pairs. Front tarsi entirely brownish or blackish, mid pair clear yellow with last two segments darkened, hairs on all tarsi very short.

Wings greyish, with clouding on cross-veins and at tip. Squamae whitish grey, with fringe of long yellow hairs. Halteres entirely light brownish yellow.

FEMALE. Length (exclusive of snout and antennae), 12 mm.; wing-length, 11·5 mm. Resembling male in general appearance, differing as follows. Eyes widely separated, becoming increasingly divergent from level of front ocellus to base of projecting portion of frons. Vertex rather heavily yellow-dusted from occiput to a point slightly below front ocellus. Frons rather narrowly pale yellow-dusted at sides and along a very narrow central strip which extends to base of projecting portion of frons, clothed with long yellow hairs, these becoming longer behind, and admixed with black hairs above vertical triangle.

Abdomen rotund, but less so than in *albipes* ♀. Coloration of first tergite as in male, but second and third entirely greenish black, fourth and fifth clear orange-yellow, broadly greenish black laterally.

NORTH INDIA : Darjeeling, 7,000 ft., 11–15.ix.1905, 1 ♂ (Type) (*E. Brunetti*) ; Simla, 7,000 ft., x.1945, 3 ♂ (*T. Jermyn*) ; near Sureil, 18.x.1917, 2 ♂ (*N.A.* and *F.G.*). EAST NEPAL : Taplejung District, from damp evergreen oak forest above Sangu, c. 9,200 ft., resting on fern leaf in sun, 2–26.xi.1963, 1 ♀. In Brit. Mus. (Nat. Hist.).

Lycastris cornutus Enderlain

Lycastris cornutus Enderlein, 1911 : 136 (♀).
Lycastris cornutus Enderlein (Sack), 1913 : 7 (♂).

Enderlein described *cornutus* from a single female taken at Kosempo in SOUTH FORMOSA on 23.i.1908 (*H. Sauter*), and now in the Stettin Zoological Museum. In 1913 Sack described the male from a series of both sexes taken at Hoozan and Taihorinsho in FORMOSA by the same collector on an unspecified date. Brunetti (1923 : 279) queried the validity of *cornutus* as a result of examining a female in the Brit. Mus. (Nat. Hist.). This specimen bears the data :—" Formosa, Chip Chip, 09.ii, Sauter, presented by Dr. K. Kertesz, Budapest Museum ". I have examined the specimen concerned and also a male from the same source, and find that they agree respectively with Enderlein's description of the female and Sack's subsequent description of the male of *cornutus*. The latter is certainly a good species, closely related to *flavohirta* Brunetti, from which my key characters clearly distinguish it.

So far as is known the genus *Lycastris* occurs only in the Oriental Region. The five species that I recognize in the present paper are keyed below.

1 At least second tergite with ground colour hidden by long shaggy sub-depressed yellowish hairs 2
– Ground colour clearly visible on all tergites, the mainly or entirely pale hairs shorter, scantier and at most sub-depressed on posterior margins 3
2 Wings intensely infuscated along at least anterior half, fading off towards tip and posteriorly . . . . **austeni** Brunetti
– Wings evenly greyish, with slight clouding on cross-veins . . . **griseipennis** sp. n.
3 Tergites 2–4 shining black, any pale markings restricted to extreme base and tip of tergites, and occasionally a small yellowish somewhat triangular area at basal corners of third tergite. Male front femora thickened, ventrally with a short blackish projection shortly before middle ; hind femora considerably swollen, convex above, pale at extreme tip, otherwise black. Female hind femora similarly coloured . . . . **albipes** Walker
– Tergites 2–4 otherwise coloured, brownish or greenish or a mixture of both. Male front femora simple ; hind femora scarcely swollen, not convex above, yellow for at least apical quarter. Female hind femora similarly coloured . . . 4
4 Face strongly hollowed, concave, for short distance immediately under antennae ; legs with all femora fringed with long black hairs for basal half of front and mid pairs and basal three-quarters of hind pair ; hind tibiae black haired on about apical third, all tibiae otherwise with pale yellow fringe . . **cornutus** Enderlein

– Face descending, not obviously hollowed, for short distance immediately under antennae ; all femora and tibiae fringed with long pale yellow hairs, these somewhat shorter on front pair, black hairs practically confined to a short mid-ventral patch on hind femora . . . . ***flavohirta*** Brunetti

Subfamily **CALLICERINAE**

Callicera doleschalli Verrall

Callicera doleschalli Verrall, 1913 : 328.

Verrall described this rather inconspicuous species from a single male example taken by Lieut. E. Y. Watson in the North Chin Hills in BURMA, 5,000 ft., iii.1893. Its almost entirely reddish orange legs distinguish it from other Oriental species with the first antennal segment scarcely or not longer than the second. As Verrall mentions in his original description, the abdomen of the type is much spoilt by damp, and it is difficult to make out the colouring of the tergites. This apparently unique example of the species is in the Brit. Mus. (Nat. Hist.).

Callicera sumatrensis de Meijere

(Text-fig. 12)

Callicera sumatrensis de Meijere, 1919 : 26 (♀).
Callicera pendleburyi Curran, 1928 : 273. **Syn. n.**

De Meijere described this species from a single female taken at Suban Ajam in SUMATRA by Herrn. Edw. Jacobson in July, 1916. From the original description it appeared to me to be closely related to *pendleburyi* Curran, and at first I separated the two species in my key by the rather unsatisfactory character of the entire antennae being black in *sumatrensis* (as stated by de Meijere) and the first segment reddish in *pendleburyi*. Later, de Meijere's type female of *sumatrensis* was kindly lent to me by Dr. Willem N. Ellis from the collection in the Zoological Museum of the University of Amsterdam. Examination proved that the first antennal segment in this specimen is obviously reddish and not black as stated by de Meijere. Indeed, *sumatrensis* and *pendleburyi* are identical, and the latter becomes a synonym of the former.

Curran fully and accurately described *pendleburyi* from five males taken at Cameron's Highlands, Pahang, MALAYA, the full data of the material being as follows :—Rhododendron Hill, 5,200 ft., 20.vi.1923, 1 ♂ ; Gunong Berumban (summit), 6,050 ft., 14.iii. and 17.vi.1923, 3 ♂ ; same locality, 5,100 ft., 12.iii.1925, 1 ♂ (*H. M. Pendlebury*). In subsequent years Pendlebury collected many further examples (with one exception, males) from the same localities as before, and a single male from NORTH BORNEO. His material forms the entire series of forty-two specimens in the Brit. Mus. (Nat. Hist.). Curran was apparently unaware that a female existed in the B.M. material and did not describe that sex.

As de Meijere's description of the type female of *sumatrensis* was taken from a somewhat teneral and rubbed specimen and is not entirely accurate (as shown earlier) I give below the main features in which that sex differs from the male, using for comparison the single female that I have found in the B.M. series of *pendleburyi* :—Antennae (Text-fig. 12) with segments proportionately longer ; eyes widely separated, the space between them steadily widening from shortly below front ocellus to their lowest extremity, at least twice as widely separated at level of antennae as at level of front ocellus ; eye-hairs shorter and all pale ; thorax much more shining aeneous, less greenish black ; tergites with shorter hairs ; legs almost entirely pale haired. The data of the female examined is as follows :— " Cameron's Highlands, Pahang, 4,800 ft., 7.vi.1935 ".

It should be noted that in his description Curran gives the length of *pendleburyi* as 12–12·5 mm. This may be taken as an average body measurement, but among the long series of males subsequently taken by Pendlebury the range is from 10–13 mm. De Meijere gives the length of the holotype female of his *sumatrensis* as 9 mm., but actually it measures 10 mm.

Callicera robusta sp. n.

(Text-fig. 11)

This species is distinguished from other Oriental *Callicera* with the first antennal segment at least twice as long as second by, among other characters, the almost entirely clear reddish orange legs. It is also larger than the rest.

MALE. Length (exclusive of antennae), 15 mm.; wing-length, 13·5 mm. Eyes actually touching for a distance about equal to twice the length of vertex, clothed with rather short pale yellow hairs, which become light brown on the upper part, and with a vertical central band of dark brown hairs. Frons shining bluish black, with a narrow yellowish orange lunule at base of antennae, bare. Face shining bluish black, clothed with rather long yellowish hairs, except for a broad bare central strip which is widest at level of facial knob, eye-margins broadly pale yellow-dusted. Antennae with first two segments reddish orange, third black, very obscurely orange beneath on about basal half, first twice as long as second, third two-and-a-half times as long as first and second together ; arista whitish with black base, about one-third as long as third segment.

Thorax dull bluish black, clothed with rather long yellowish hairs, these intermixed with dark brown hairs on about posterior third ; scutellum dull bluish black with long upright dark brown hairs on disc and fringed with long yellow hairs.

First and second tergites moderately shining bluish black, third and fourth metallic bronzy green, abdomen entirely clothed with rather long yellowish hairs, no black hairs traceable on the partly denuded abdomen of the single male examined ; sternites metallic bronzy green.

Legs, apart from coxae and trochanters, clear reddish orange ; four anterior femora with longish hairs, mainly yellow and mainly brownish ventrally, posterior pair with mainly yellow hairs anteriorly, and rather sparse mixed black and yellow hairs ventrally.

Wings clear greyish, inclined to be yellowish tinged anteriorly, stigma yellowish. Squamae smoky grey, with long pale yellow fringes. Halteres with pale yellow stem and dark brown to blackish knob.

FEMALE. Agreeing with the male, apart from the following differences :—Antennae (Text-fig. 11) with segments proportionately longer, third segment conspicuously clear orange for about basal half ; eyes widely separated, the space between them steadily increasing from shortly below front ocellus to their lowest extremity, about twice as widely separated at level of antennae as at level of front ocellus ; eye-hairs only slightly shorter than in male, paler, but similarly becoming darker on the upper part, and with a vertical central band of darker hairs. Thorax more shining aeneous black, less bluish black ; scutellum similar ; tergites with shorter and paler hairs ; legs almost entirely pale-haired. Length (exclusive of antennae), 13–14·5 mm.; wing-length, 12–13 mm.

Holotype ♂. N.E. INDIA : Naini Hills, 7,000–8,000 ft., 13.v.1927 (*T. Jermyn*).

Paratypes. N.E. INDIA : Naini Hills, Kunj Khanak, 8,000 ft., 24–25.v.1927, 3 ♀ (*T. Jermyn*) ; 7,000–8,000 ft., 14–25.v.1927, 3 ♀ (*T. Jermyn*). In Brit. Mus. (Nat. Hist.).

The distinctive characters of this species are given in the key on p. 289.

Callicera nitens sp. n.

This species is distinguished from the other five Oriental *Callicera* dealt with in this paper by, among other characters, the glittering black appearance of the frons, scutellum and third and fourth tergites. The hairs of the eyes and body are exceptionally long for the sex in the single female described.

FEMALE. Length (exclusive of antennae), 13 mm.; wing-length, 12 mm. Eyes widely separated, the space between them steadily increasing from shortly below front ocellus to their lowest extremity, about twice as widely separated at level of antennae as at level of front ocellus; eye-hairs exceptionally long for a female, whitish below, light brownish on upper part, no obvious vertical central band of darker hairs. Frons, vertex and upper part of occiput glittering black, with noticeably long blackish hairs. Face with the blackish ground colour scarcely obscured by the thin evenly distributed pale yellow dusting, and with long yellowish white hairs. Antennae black, the basal segment shining, second and third dull ; first twice as long as second, third about two-and-a-half times as long as first and second together (inner measurement) ; arista white, shortly black at the thickened base, more than half as long as third antennal segment.

Thorax glittering black, with long yellowish white hairs anteriorly, these mainly blackish posteriorly ; scutellum glittering black, with long whitish hairs ; pleurae greenish black, lightly dusted whitish, with very long thick whitish hairs.

Abdomen with first tergite dull grey, second similar but narrowly glittering black along posterior margin, third and fourth entirely glittering black ; hairs on tergites long, becoming longer on succeeding tergites, yellowish white on first and basal half of second, tawny haired on apical half of second, third tawny-haired on disc, black-haired towards sides, fourth entirely tawny-haired. Sternites shining black, with long greyish hairs.

Coxae and trochanters black, legs otherwise uniformly reddish, except last three or four tarsal joints darkened and about apical half of hind metatarsi dorsally. Front femora with fringe of mixed black and yellowish white hairs behind and below, mid pair with posterior fringe of long whitish hairs and a few mixed black and whitish hairs towards base below, hind pair with a fringe of long whitish hairs anteriorly and below ; tibiae with a fringe of short black hairs, posteriorly on the first and second pairs, anteriorly on the third.

Wings with greyish membrane, stigma dark brownish, a dark cloud extending broadly down from before base of stigma across middle of wing for about anterior half. Squamae greyish, with pale yellow fringe of moderate length. Halteres with light brown stalk and greyish knob.

Holotype ♀. EAST NEPAL : Taplejung District, damp evergreen oak forest above Sangu, c. 9,200 ft., 2–26.xi.1961. In the Brit. Mus. (Nat. Hist.).

The distinctive features are detailed in the key on p. 289.

Callicera sanguensis sp. n.

This species is characterized by the sharp contrast of the long grey thoracic hair and the foxy red hair of the tergites.

MALE. Length (exclusive of antennae), 12 mm.; wing-length, 11 mm. Eyes actually touching for a distance more than twice the length of vertex, clothed with rather long pale yellowish brown hairs, these becoming blackish on upper part and along a vertical central band of hairs. Frons shining purplish black, greenish at the base and down the sides, bare, lunule with no obvious yellow marking ; face polished black, very slightly grey-dusted against the broad fawn eye-margins. Antennae dull black, except third segment reddish below for less than basal half ; first segment twice as long as second, third about twice as long as first and second together (inner measurement) ; arista white, shortly black at the thickened base, nearly half as long as third antennal segment.

Thorax dull greenish black, uniformly clothed with long pale yellowish grey hairs ; scutellum similarly coloured, but with noticeably long upright black hairs on disc and still longer pale hairs along posterior border and a fringe of short pale hairs submarginally ; pleurae dull bronzy green, clothed with long thick greyish white hairs.

Abdomen with first tergite bronzy green, slightly shining, second tergite dull black, third slightly shining black and fourth more brightly so ; tergites uniformly clothed with long upright foxy red hairs. Sternites slightly shining greyish brown, with long greyish yellow hairs.

Coxae and trochanters black ; femora black, narrowly yellow-tipped ; four anterior tibiae and tarsi light brownish ; hind tibiae darkened on about apical fifth, otherwise light brownish ; hind tarsi light brownish, darkened above. Four anterior femora with postero-ventral and posterior fringe of rather long light yellowish brown hairs, hind pair with an antero-dorsal and anterior fringe of similar hairs and some longer similarly coloured hairs scattered antero-ventrally and ventrally ; four anterior tibiae with a posterior fringe of rather short light yellowish brown hairs, hind tibiae with a similar but anterior fringe.

Wings clear and transparent apart from the light yellow stigma. Squamae grey with a fringe of moderately long hairs, which are peculiar in appearing light golden brown from above and blackish from below. Halteres light brown, the knob partly darkened.

Holotype ♂. EAST NEPAL : Taplejung District, c. 6,200 ft., from mixed vegetation by stream in gully, x.1961–i.1962. British Museum East Nepal Expedition. In Brit. Mus. (Nat. Hist.).

The distinctive features are detailed in the key on p. 289.

Callicera sackeni Verrall

Callicera sackeni Verrall, 1913 : 331.

Verrall described this species from a single male taken by Lieut. E. Y. Watson at Fort White in the North Chin Hills, BURMA, 7,000 ft., iv.1893. This sole representative of the species is in the Brit. Mus. (Nat. Hist.). Unfortunately, for many years this specimen has been a mere fragment, headless, legless, and almost wingless, and is quite unrecognizable. On examining a series of one male and six females placed with it over the name label of *sackeni* and comparing their characters with Verrall's description of the latter I found that they represent a distinct species, which I have described earlier in this paper as *robusta*. I will not repeat Verrall's excellent description of *sackeni*, which has already been transcribed word for word by Brunetti (1923 : 306). It is clearly differentiated in the following key to the six Oriental species of *Callicera* that I now recognize.

1 First antennal segment at least twice as long as second (inner measurement) . . 2
– First antennal segment not nearly twice as long as second, usually subequal (inner measurement) 4
2 Legs, apart from coxae and trochanters, entirely clear reddish orange . ***robusta*** sp. n.
– At least tarsi partly blackish 3
3 Frons, thorax, scutellum and third and fourth abdominal tergites glittering black ***nitens*** sp. n. ♀ (♂ unknown)
– Thorax and scutellum dull greenish black, second tergite dull black, third and fourth black, only moderately shining . . . . . ***sanguensis*** sp. n. ♂ (♀ unknown)
4 Femora mainly blackish 5
– Femora reddish orange, only darkened at extreme base ***doleschalli*** Verrall ♂ (♀ unknown)
5 Third antennal segment quite three times as long as first and second together (inner measurement) . . . . ***sackeni*** Verrall ♂ (♀ unknown)
– Third antennal segment only slightly longer than first and second together (inner measurement) . . . . ***sumatrensis*** de Meijere

Microdon bellus Brunetti

Microdon bellus Brunetti, 1923 : 315.

East Nepal : Taplejung District, c. 6,500 ft., at edge of mixed forest above Sangu, resting on stone slab in sunshine, 17.x–1.xi.1961, 1 ♀.

Described from two females taken at Mussoorie, Northern India.

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—— 1830. *Aussereurop. zweifl. Insekten.* **2** : xii + 684 pp.

ZETTERSTEDT, J. W. 1843. *Diptera Scandinaviae*, **2** : 441–894.

DIPTERA FROM NEPAL

SIMULIIDAE

By D. J. LEWIS

SYNOPSIS

All the specimens examined were collected in East Nepal by Mr. R. L. Coe in 1961 or 1962 and are in the British Museum (Natural History). They comprise three species, one of which is described as new. Descriptive notes are given of the single females of the other two, which cannot be identified until males or pupae are obtained.

I thank Mr. Coe for the opportunity of studying his collection. He informs me that he caught most specimens by sweeping with a net, and saw none biting.

Simulium nepalense **sp. n.**

(Text-figs. 1–16)

FEMALE. Wing length about 2·2 to 2·7 mm. *Head.* Frons and clypeus grey with pale scales. Antenna with segments 1 and 2, and most of 3, orange, the rest grey. Palp dark brown, vesicle as figured. Cibarium with a median ventral dark stripe having a double end. *Thorax.* Basisternum and furcasternum as figured. Scutum grey with three faint dark stripes ; covered with recumbent scales which are brown over the stripes and brassy elsewhere. Scutellum with recumbent brassy scales in the centre and some dark hairs at the sides. Postscutellum bare and brown. Pleuron dark grey to brown, pleural membrane bare, pleural tuft brassy. Katepisternum with recumbent hairs. Legs with yellow and dark brown markings as figured, claw toothed. Calcipala and pedisulcus well developed. Stem vein and radius with many dark hairs, subcosta with very few. *Abdomen.* Scale and basal fringe pale, tergum 2 mainly pale or transparent, the rest brown, 6 to 8 being shiny. Sternite 1 is a vestigial colourless crescent 0·07 mm. wide and 0·02 mm. deep near the posterior border of its segment. Terminalia as figured, spermatheca with internal spicules and smooth surface.

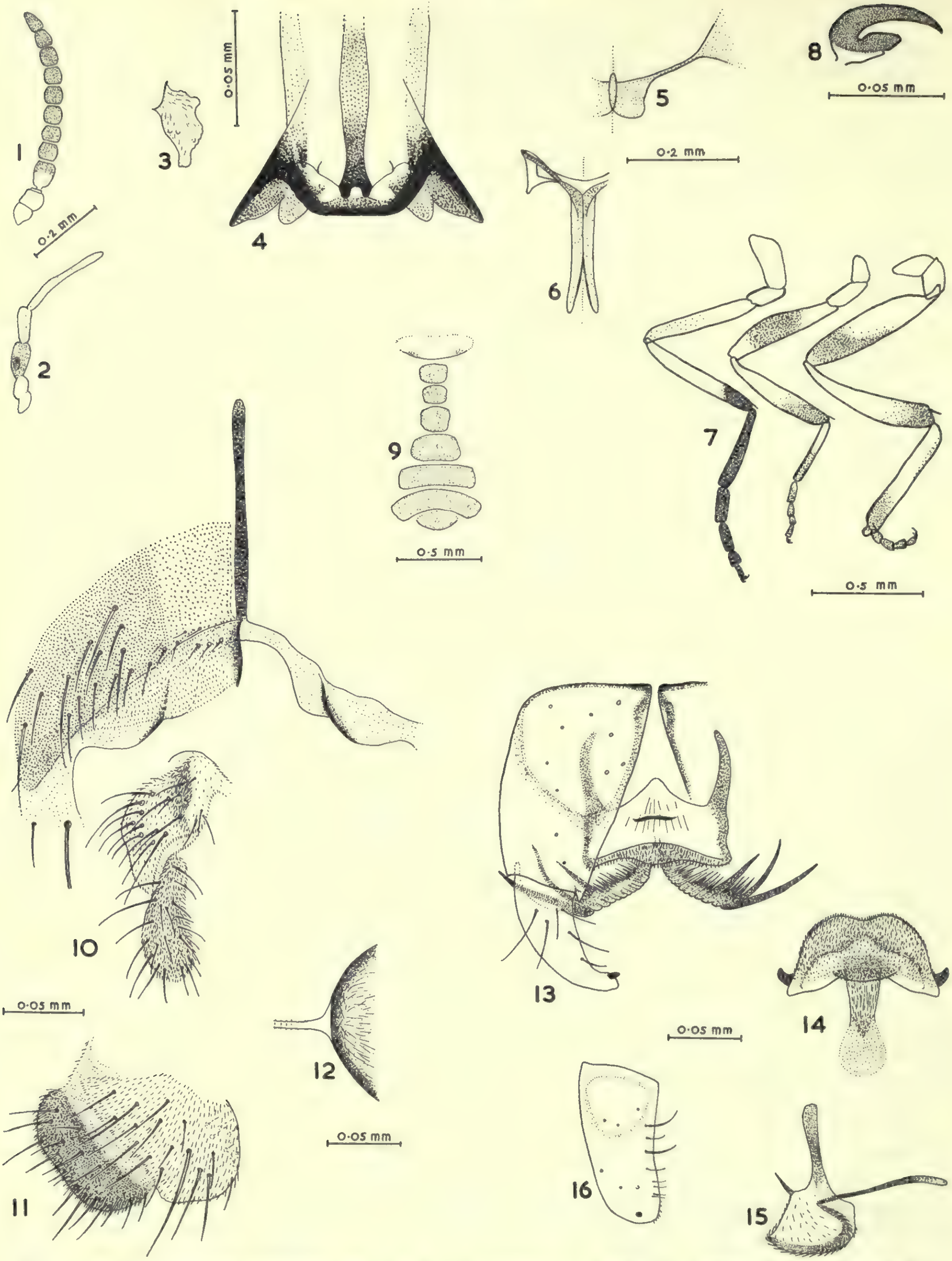
MALE. Very like the female in general colouring. *Head.* Frons, clypeus, antenna and palp coloured much as in female. *Thorax.* Scutum like that of female. Legs 1 and 2 coloured like those of female ; 3 with much expanded femur, tibia and basitarsus ; this leg yellow on coxa, trochanter, base of femur, basal four tenths of tibia, and basal three tenths of basitarsus, the rest dark brown. *Abdomen.* Brown ; terminalia as figured.

PUPA AND LARVA. Unknown.

Holotype ♀, Taplejung District, 3.x.1961, Sangu, 6,200 ft. (*R. L. Coe*), B.M. (Nat. Hist.).

Paratypes, Sangu, 6,200 ft., mixed vegetation by stream, ix–x.1961, 17 ♀, 4 ♂ (*R. L. Coe*), B.M. (Nat. Hist.).

Other specimens examined. Taplejung District, Dobhan, c. 3,500 ft., shady places on shrubby slope above R. Tamur, 21–27.i.1962, 4 ♀, 3 ♂ ; Sangu, 6,500 ft., evergreen shrub above village, 5–13.x.1961, 10 ♀, 3 ♂ ; c. 6,200 ft., mixed vegetation


1
0·2 mm
2
3
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12
0·05 mm
13
0·05 mm
14
15
16

FIGS. 1–16. *Simulium nepalense* sp. n. ♀. 1, antenna ; 2, palp ; 3, vesicle ; 4, cibarium ; 5, basisternum ; 6, furcasternum ; 7, legs ; 8, claw ; 9, abdominal tergites 2 to 9 ; 10, 11, terminalia ; 12, part of spermatheca. ♂. 13, terminalia ; 14, 15, ventral plate from different angles ; 16, coxite.

in deep gully, 2.i–13.ii1962, 1 ♀ ; c. 6,200 ft., mixed vegetation by stream in gully, xi.1961–i.1962, 2 ♀ ; c. 6,200 ft., old mixed forest above village, 25–28.x.1961, 1 ♀ ; c. 6,200 ft., rotting fruits of Bhor tree on ground, 7–31.x.1961, 3 ♀ ; c. 6,200 ft., yellow blooms of cultivated composite, 19–29.x.1961, 2 ♀ ; c. 6,000 ft., by stream in shady ravine below village, 13.x.1961, 5 ♀ ; c. 4,000 ft., mixed vegetation on sheltered slopes below village and above river, 3.i.1962, 1 ♀ ; Arun valley, Tumlingtar area, c. 1,800 ft., evergreen shrubs below village on sandy west shore of R. Sabhaya, 9–17.xii.1961, 1 ♀.

The structure of the male terminalia suggests that this species is related to the Javanese *S. friederichsi* Edwards, 1934, from which *S. nepalense* differs in the shape of the parameral armature, the thoracic colouring of the male, and other features. I am not allotting this species to a subgenus because no pupae are available and the Oriental species are not sufficiently known. The basisternum, and the furcasternum of the metasternum, have been used for description by Davies et al. (1962).

Simulium sp. A

(Text-figs. 17–22)

FEMALE. Wing length 2·4 mm. *Head.* Frons, clypeus and posterior surface of head grey pruinose ; some brassy scales on the clypeus at least. Antenna yellow. Palp dark brown, vesicle as figured. *Thorax.* Scutum brown pruinose without definite markings, with at least some recumbent brassy scales. Pleural membrane bare. Legs with yellow and brown markings as figured, claw toothed. Calcipala and pedisulcus well developed. Stem vein and radius with dark hairs. *Abdomen.* Tergite 3 is 2·6 times as broad as long. Terminalia as figured ; spermatheca without spicules ; and in this specimen the brown capsule bulges where it joins the duct.

MALE AND PUPA. Unknown.

Specimen examined. Sangu area, c. 6,500 ft., in evergreen scrub above village, 5–13.x.1961, 1 ♀.

I am not attempting to name this or the next species because only single females are at present available.

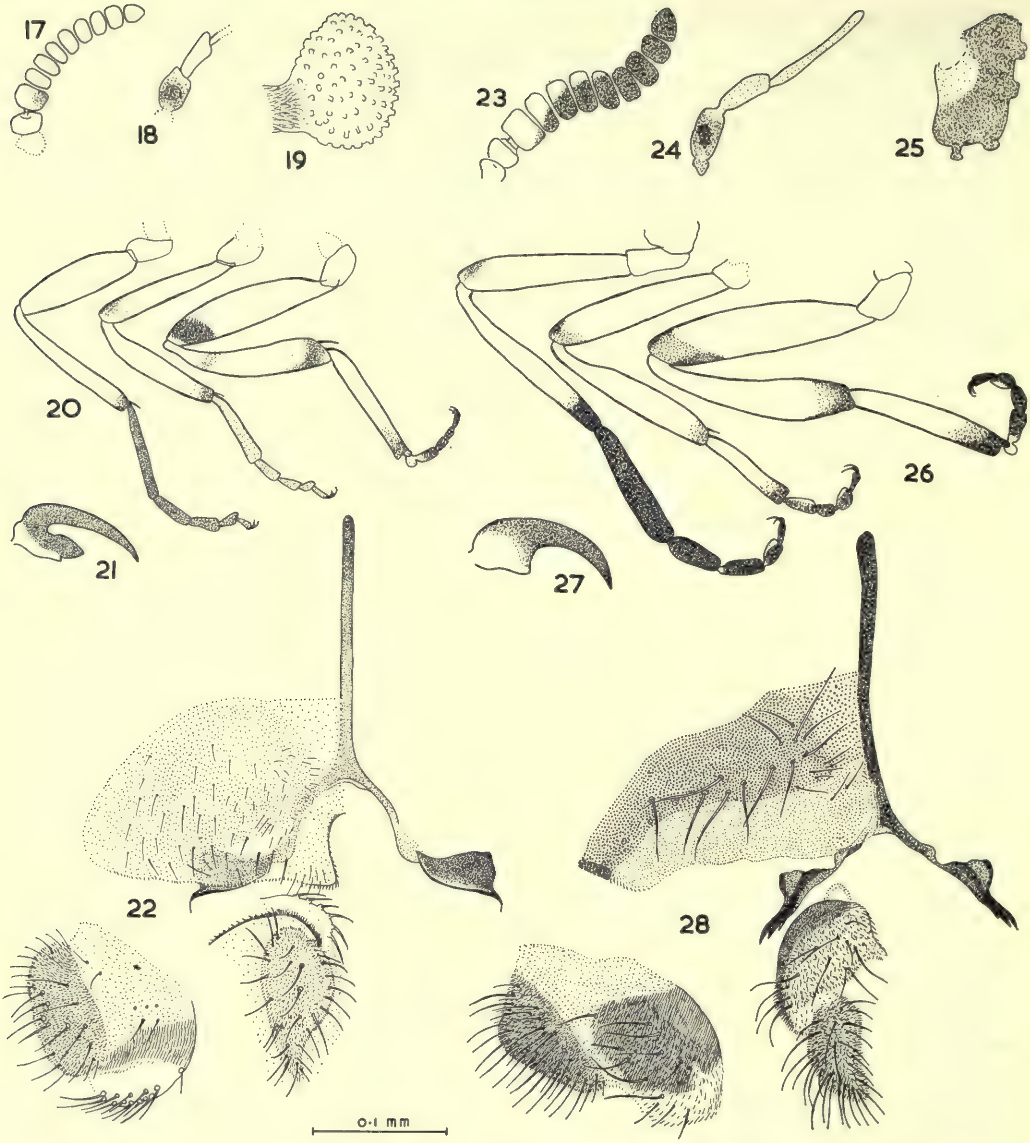
Simulium sp. B

(Text-figs. 23–28)

FEMALE. Wing length 3·3 mm. *Head.* Frons and clypeus pruinose grey with sparse dark hairs. Antenna orange and grey as figured. Palp dark brown, vesicle as figured. *Thorax.* Scutum grey pruinose with dark stripes, one narrow median, two submedian and two broad ones near the lateral margin ; narrow recumbent brassy scales present. Legs with yellow and dark brown markings as figured, claw toothed. Calcipala and pedisulcus well developed. Stem vein with dark scales, radius mainly bare in this specimen. *Abdomen.* Scale and basal fringe pale, tergum 2 mainly pale or transparent, segments 4 and 5 (and possibly anterior ones) grey laterally in cleared preparations. Terminalia as figured, spermatheca apparently without spicules.

MALE AND PUPA. Unknown.

Specimen examined. Sangu area, c. 6,200 ft., mixed vegetation by stream in gully, xi.1961–i.1962, 1 ♀.



FIGS. 17–28. 17–22, *Simulium* sp. A ♀. 17, antenna ; 18, part of palp ; 19, vesicle ; 20, legs ; 21, claw ; 22, terminalia. 23–28, *S.* sp. B ♀. 23, antenna ; 24, palp ; 25, vesicle ; 26, legs ; 27, claw ; 28, terminalia.

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NATURAL HIST

A REVISION OF THE GENUS *TYLOPSIS* FIEBER (ORTHOPTERA: TETTIGONIIDAE)

D. R. RAGGE

BULLETIN OF
THE BRITISH MUSEUM (NATURAL HISTORY)
ENTOMOLOGY Vol. 15 No. 9
LONDON: 1964

A REVISION OF THE GENUS *TYLOPSIS* FIEBER (ORTHOPTERA: TETTIGONIIDAE)

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BY

D. R. RAGGE
British Museum (Natural History)

Pp. 295–322 ; 52 *Text-figures*

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THE BRITISH MUSEUM (NATURAL HISTORY)
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THE BULLETIN OF THE BRITISH MUSEUM (NATURAL HISTORY), *instituted in* 1949, *is issued in five series corresponding to the Departments of the Museum, and an Historical series.*

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This paper is Vol. 15, *No.* 9 *of the Entomological series. The abbreviated titles of periodicals cited follow those of the World List of Scientific Periodicals.*

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TRUSTEES OF
THE BRITISH MUSEUM (NATURAL HISTORY)

Issued 4th September, 1964 *Price Eleven Shillings*

A REVISION OF THE GENUS *TYLOPSIS* FIEBER (ORTHOPTERA : TETTIGONIIDAE)

By D. R. RAGGE

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SYNOPSIS

The genus *Tylopsis* Fieber is fully revised and a key is given to the species. Seven specific synonyms are newly established and three new species are described.

INTRODUCTION

TYLOPSIS Fieber is one of the most easily recognized genera of Phaneropterinae. Its species present more difficulty, however, and the description of a number of new African species during the past twenty years has made the identification of the Ethiopian members of the genus even more difficult. It is hoped that this revision, the first since Brunner's Monograph of 1878, will remedy this situation.

The genus was first given the name *Centrophorus* by Fischer de Waldheim in 1846 ; he based the name on some immature specimens, which he named *C. spinosus*. This generic name subsequently proved to be a homonym of a genus of fish described by Müller & Henle in 1837, and the specific name was a synonym of *Locusta lilifolia* Fabricius, 1793.

The genus *Tylopsis* was erected by Fieber in 1853 for the single species *Locusta lilifolia* Fabricius. This generic name later became involved in a controversy concerning the type-species of *Phaneroptera* Serville, 1831 (see Ragge, 1956 : 206), of which one of the two originally included species was misidentified as *L. lilifolia* Fabricius. In 1944, however, *Tylopsis* Fieber was added to the Official List of Generic Names in Zoology, with *L. lilifolia* Fabricius as its type-species (Hemming, 1944).

Kirby, in his Catalogue of 1906, listed ten species of *Tylopsis* Fieber. Ten species are also recognized in the present revision, though five of these names are new to those listed by Kirby. Two of the names in Kirby's list, "*T. plana* (Walker)" and "*T. turbata* (Walker)" do not belong to *Tylopsis* Fieber (see below), and three further names have been found to be junior synonyms.

The species listed in Kirby's Catalogue as " *T. plana* (Walker) ", based on a male holotype, may be placed for the time being in the genus *Symmetropleura* Brunner, 1878. This genus is based on a Neotropical type-species, *S. laevicauda* Brunner, 1878, and contains two further Neotropical species and two African species. It is quite possible that these African species will eventually be given separate generic status and that the present species, which is not closely related to them, will be considered to represent a third distinct genus, but it would not be appropriate to settle these questions here.

The species listed by Kirby as " *T. turbata* (Walker) ", which is known only from the male holotype, belongs to the genus *Phlaurocentrum* Karsch, 1888. The holotype is unfortunately in very bad condition, and it is impossible to draw any conclusions regarding its affinity with the other species of *Phlaurocentrum* Karsch ; the genitalia, which are of prime diagnostic importance, are not mentioned in the original description. The name is thus a nomen dubium, though it seems likely that it is synonymous with one of the nominal species of *Phlaurocentrum* Karsch at present recognized (see Ragge, 1962).

The nomenclatural adjustments that follow from the above considerations are set out below.

Symmetropleura plana (Walker, 1869) **comb. n.**

Phaneroptera plana Walker, 1869 : 339. Holotype ♂, SOUTH AFRICA : Natal (Brit. Mus. (Nat. Hist.)).
Tylopsis plana (Walker), Kirby, 1906 : 441.

Phlaurocentrum turbatum (Walker, 1869) **comb. n.**

Phaneroptera turbata Walker, 1869 : 340. Holotype ♂, " CONGO " (Brit. Mus. (Nat. Hist.)).
Tylopsis turbata (Walker), Kirby, 1906 : 441.

Access was gained to all the type-specimens that have not been lost or destroyed except for those of *T. dubia* Giglio-Tos, 1907 (in the Istituto e Museo di Zoologia della Università, Turin) and *T. coi* Jannone, 1936 (in the Istituto e Laboratorio di Entomologia Agraria, Portici). *T. dubia* Giglio-Tos, which is based on three syntypes from East Africa, cannot unfortunately be identified from the original description, though it is almost certainly one of the species recognized in this revision ; I have therefore been forced to omit it. *T. coi* Jannone is discussed on p. 305.

For most of the species the material examined was rather extensive ; where the data of this material are listed I have therefore abbreviated it for all the previously described species except *T. dispar* Sjöstedt and *T. gracilis* Chopard, by omitting the collectors' names, restricting the datal information to the month (represented by a Roman numeral), and abbreviating names of provinces, where repeated, to their initial letters. The data of type-material are, however, given in full for every species.

Throughout this paper " Congo Republic " refers to the former Belgian colony. The author's usual conventions are observed (see Ragge, 1957 : 124).

ACKNOWLEDGMENTS

My most sincere gratitude is due to the following specialists, who have been kind enough to send me type-specimens or other material from their respective institutions :—

Dr. A. de Barros Machado, Mr. P. Basilewsky, Dr. M. Beier, Mr. R. H. Carcasson, Dr. L. Chopard, Dr. J. de A. Fernandes, Dr. F. Keiser, Professor C. H. Lindroth, Mr. E. Morales Agacino, Mr. E. C. G. Pinhey, Mr. D. C. Rentz, Mr. W. Richter, Mr. R. Roy, Mr. E. Taylor, Professor E. Tortonese and Dr. G. van Son.

I am particularly grateful to the following workers, who have very kindly sent me specimens collected by them personally :—

Mr. & Mrs. R. W. Crosskey, Mr. A. E. King, Mr. M. Lamotte and Mr. J. A. Whellan.

I should also like to thank Mrs. P. M. Newman for help with the measurements.

MATERIAL

In addition to the collection of *Tylopsis* Fieber in the British Museum (Natural History) material was lent by the sources listed below, through the courtesy of the specialists mentioned above (the abbreviations used where the material is listed in detail are inserted in parenthesis).

Museu do Dundo, Lunda, Angola (Mus. Dundo) ; Musée Royal de l'Afrique Centrale, Tervuren (Mus. Af. Cent.) ; Naturhistorisches Museum, Vienna (Nat. Mus. Vienna) ; Coryndon Museum, Nairobi (Coryndon Mus.) ; Muséum National d'Histoire Naturelle, Paris (Mus. Hist. Nat. Paris) ; Museu e Laboratório Zoológico e Antropológico, Lisbon (Mus. Zool. Lisbon) ; Naturhistorisches Museum, Basle (Nat. Mus. Basle) ; Zoologisches Museum of the Humboldt-Universität, Berlin (Zool. Mus. Berlin) ; Naturhistoriska Riksmuseum, Stockholm (Nat. Riksmus, Stockholm) ; South African Museum, Cape Town (S.A. Mus.) ; Universitetets Zoologiska Institution, Lund (Zool. Inst. Lund) ; Instituto Español de Entomología, Madrid (Inst. Esp. Ent.) ; National Museum of Southern Rhodesia, Bulawayo (Nat. Mus. S. R.) ; California Academy of Sciences, San Francisco (Cal. Acad. Sci.) ; Staatliches Museum für Naturkunde, Stuttgart (Staatl. Mus. Nat. Stuttgart) ; Institut Français d'Afrique Noire, Dakar, Senegal (I.F.A.N. Dakar) ; University Museum, Oxford (Univ. Mus. Oxford) ; Museo Civico di Storia Naturale, Genoa (Mus. Stor. Nat. Genoa) ; Transvaal Museum, Pretoria (Transvaal Mus.) ; Institut de Recherche Scientifique de Madagascar, Tananarive (Inst. Sci. Madag.).

TYLOPSIS Fieber, 1853

Centrophorus Fischer de Waldheim, 1846 : 361. Type-species, by monotypy, *Centrophorus spinosus* Fischer de Waldheim, 1846. (Homonym of *Centrophorus* Müller & Henle, 1837.)

Tylopsis Fieber, 1853 : 172. Type-species, by monotypy, *Locusta lilifolia* Fabricius, 1793.

Tylopsis Fieber, Hemming, 1944 : 211. (Addition to Official List.)

DIAGNOSIS. ♂ ♀. Fastigium of vertex compressed, narrow, sulcate above. Pronotum without lateral carinae ; lateral lobes almost always distinctly longer than deep. Fore coxae with well-developed spine. Fore tibiae with slit-like tympanic opening on each side. Terminal lateral lobes of femora often elongate. Hind femora unarmed. Abdominal tergites usually with median carina ; posterior margins often produced into point.

DISCUSSION. *Tylopsis* Fieber is a remarkably well-defined genus, with no close relatives among other Phaneropterinae ; in his Monograph of 1878 Brunner placed it in a group of its own, and it has acquired no synonyms since it was first established. Its facies is *Phaneroptera*-like (though usually more attenuate), but it is clearly separated from *Phaneroptera* Serville and allied genera by its slit-like tympanic apertures.

The male genitalia of *Tylopsis* Fieber are unusually uniform, all the known species having a subgenital plate of the same form and showing few striking differences in the structure of the cerci. The genus is in fact unusual among Tettigoniidae in that it is necessary to have specimens of both sexes in order to be certain of the identity of some of the species. Although most of the species have a very similar ovipositor, the female subgenital plate shows marked differences in shape, clearly characterizing a number of the species. In some species, however, this structure shows considerable geographical variation : this is especially true of *T. lilifolia* (Fabricius) (see p. 305) and *T. irregularis* Karsch (see p. 307). Among non-sexual characters the shape of the lateral pronotal lobes provides a useful character for separating the species, but is also sometimes subject to geographical variation.

DISTRIBUTION. *Tylopsis* Fieber occurs throughout the Ethiopian Region and extends northwards through the Mediterranean Region into the southernmost parts of European Russia.

KEY TO THE SPECIES

As mentioned above it is desirable to have specimens of both sexes when identifying species of *Tylopsis* Fieber : in some species the males are more easily recognizable, in others the females, and in some a certain identification is difficult if either sex is not available.

In comparing the male cerci with Text-figs. 1–13 it is essential to view them from above and *at right-angles to the principal plane of curvature*. In determining the relative lengths of the fore wings and hind femora it is necessary to measure both these structures, and not to draw conclusions from the relative positions of the hind knees and the tips of the flexed fore wings.

1 Pronotal disc dark brown or red-brown, contrasting with the paler lateral pronotal lobes 2

– Pronotal disc similar in colour to the lateral pronotal lobes, or with the dark colouring restricted to a narrow median band 4

2 Fore wings less than 20 mm. in length. Male cerci as in Text-fig. 13
T. gracilis Chopard (p. 321)

– Fore wings more than 20 mm. in length (except in the brachypterous form of *T. continua* (Walker)—see p. 317). Male cerci as in Text-figs. 9–12 . . 3

3 Male cerci as in Text-fig. 12, bent upwards near the apex. Basal plates of the ovipositor with a posteroventral lobe, as in Text-fig. 49
T. rubrescens Kirby (p. 319)

– Male cerci as in Text-figs. 9–11, not or hardly bent upwards near the apex. Basal plates of the ovipositor without a posteroventral lobe, as in Text-figs. 47 and 48
T. continua (Walker) (p. 316)

4 Fore wings comparatively short and broad, with a strongly convex anterior margin, as in Text-fig. 14. Dorsal spines of the hind tibiae mostly large and widely spaced, as in Text-fig. 16 . . . . **T. brevis** sp. n. (p. 314)

– Fore wings of normal shape, similar to Text-fig. 15. Dorsal spines of the hind tibiae of normal size, as in Text-fig. 17 5

5 Male 6

– Female 12

6 Cerci markedly undulate at the apex, as in Text-fig. 3. Lateral pronotal lobes shaped as in Text-figs. 20–22, with produced posteroventral angle **T. irregularis** Karsch (p. 306)

– Cerci not as in Text-fig. 3, less or not at all undulate at the apex. Lateral pronotal lobes not shaped as in Text-figs. 20–22, or, if similar (Text-figs. 23 or 26), cerci as in Text-figs. 4 or 5 7

7 Lateral pronotal lobes shaped as in Text-figs. 18 and 19. Fore wings shorter than the hind femora. (S. Russia, Mediterranean Region and Arabia) **T. lilifolia** (Fabricius) (p. 305)

– Lateral pronotal lobes not shaped as in Text-figs. 18 and 19. Fore wings almost always longer than the hind femora. (Africa south of the Sahara, and Madagascar) 8

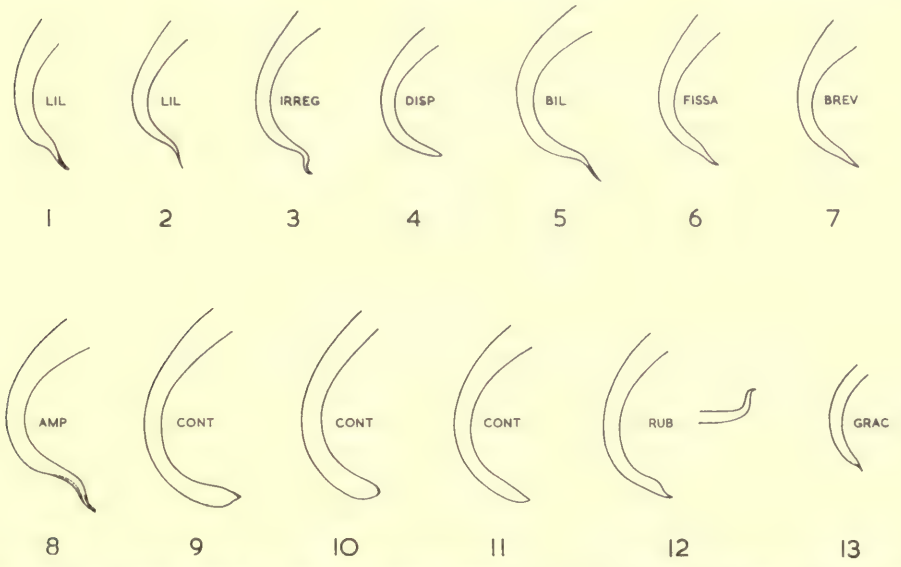
8 Cerci bent back near the apex, as in Text-figs. 5, 6 and 8 9

– Cerci not bent back near the apex, as in Text-figs. 4, 9, 10 and 11 . . . 11

9 Cerci as in Text-fig. 8, with a marked concavity on the outer side near the apex. Lateral pronotal lobes relatively deep, as in Text-fig. 30 **T. ampla** sp. n. (p. 315)

– Cerci as in Text-figs. 5 or 6, without a concavity near the apex. Lateral pronotal lobes less deep, as in Text-figs. 24–28 10

10 Cerci as in Text-fig. 5, when viewed from above, with a relatively fine point. Lateral pronotal lobes shaped as in Text-figs. 24–27. Left fore wing without a



FIGS. 1–13. Dorsal view of the left male cercus of (1) *Tylopsis lilifolia* (Fabricius) ; (2) *T. lilifolia* (Fabricius) (deserticolous form) ; (3) *T. irregularis* Karsch ; (4) *T. dispar* Sjöstedt ; (5) *T. bilineolata* (Serville) ; (6) *T. fissa* sp. n. ; (7) *T. brevis* sp. n. ; (8) *T. ampla* sp. n. ; (9) *T. continua* (Walker) (Northern Rhodesia) ; (10) *T. continua* (Walker) (Nyasaland) ; (11) *T. continua* (Walker) (Transvaal) ; (12) *T. rubrescens* Kirby (with posterior view of apex) ; (13) *T. gracilis* Chopard. N.B. In comparing specimens with these figures it is essential that the cerci are viewed at right-angles to the principal plane of curvature.

conspicuous dark spot on the stridulatory rib (Cu_2), or, if with such a spot, from Madagascar . . . . . . ***T. bilineolata*** (Serville) (p. 309)

– Cerci as in Text-fig. 6. when viewed from above, less finely pointed. Lateral pronotal lobes shaped as in Text-fig. 28. Left fore wing with a conspicuous small dark spot on the stridulatory rib (Cu_2). (Not known from Madagascar) ***T. fissa*** sp. n. (p. 312)

11 Lateral pronotal lobes shaped as in Text-fig. 23, produced somewhat posteroventrally. Cerci as in Text-fig. 4, not swollen at the apex. (Known only from north of the 10° S. line of latitude) . . . . ***T. dispar*** Sjöstedt (p. 309)

– Lateral pronotal lobes shaped as in Text-fig. 31, not produced posteroventrally. Cerci somewhat swollen at the apex, as in Text-fig. 9, in specimens from north of the 10° S. line of latitude ; otherwise sometimes as in Text-figs. 10 or 11 ***T. continua*** (Walker) (p. 316)

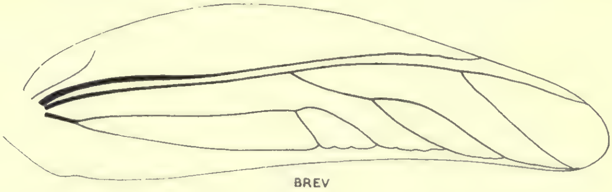
12 Subgenital plate as in Text-fig. 43, with a deep median incision at the apex ***T. fissa*** sp. n. (p. 312)

– Subgenital plate not as in Text-fig. 43, without a median incision at the apex . 13

13 Lateral pronotal lobes shaped as in Text-figs. 18 and 19. Fore wings shorter than the hind femora. (S. Russia, Mediterranean Region and Arabia) ***T. lilifolia*** (Fabricius) (p. 305)

– Lateral pronotal lobes not shaped as in Text-figs. 18 and 19. Fore wings almost always longer than the hind femora. (Africa south of the Sahara, and Madagascar) 14

14 Lateral pronotal lobes shaped as in Text-figs. 20–22, with produced posteroventral angle 15



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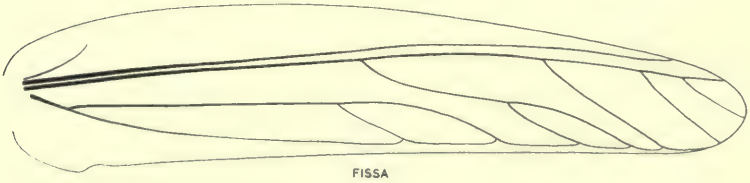

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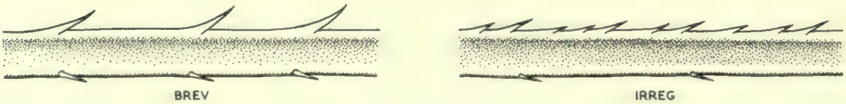
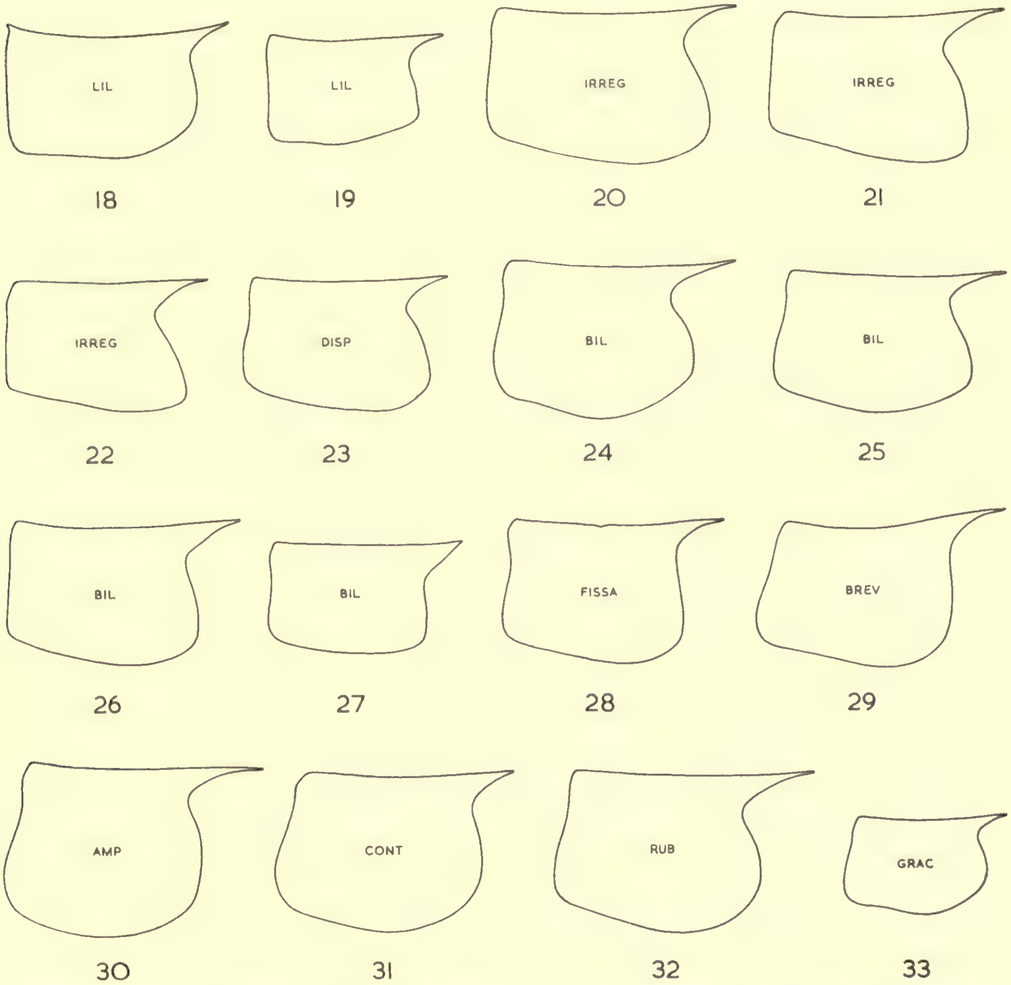
FIGS. 14–15. The right male fore wing of (14) *Tylopsis brevis* sp. n. ; (15) *T. fissa* sp. n.



16 17

FIGS. 16–17. Lateral view of part of the left hind tibia of (16) *Tylopsis brevis* sp. n. ; (17) *T. irregularis* Karsch.

– Lateral pronotal lobes not as in Text-figs. 20–22 18
15 Subgenital plate with well-developed lateral lobes, as in Text-figs. 36, 37 or 39 . 16
– Subgenital plate as in Text-figs. 38, 40, 41 or 42, without well-developed lateral lobes 17
16 Fore wings more than 28 mm. in length. (West Africa) ***T. irregularis*** Karsch (p. 306)
– Fore wings less than 28 mm. in length. (East Africa) . ***T. dispar*** Sjöstedt (p. 309)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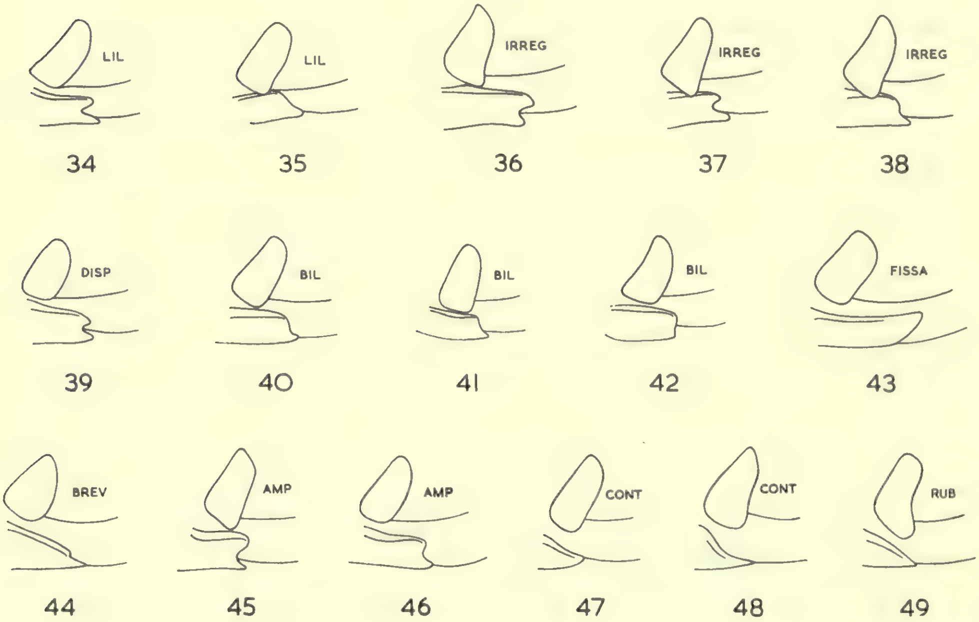
FIGS. 18–33. Lateral view of the pronotum of (18) *Tylopsis lilifolia* (Fabricius) ; (19) *T. lilifolia* (Fabricius) (deserticolous form) ; (20) *T. irregularis* Karsch (Guinea) ; (21) *T. irregularis* Karsch (Nigeria) ; (22) *T. irregularis* Karsch (Tanganyika) ; (23) *T. dispar* Sjöstedt ; (24) *T. bilineolata* (Serville) (Northern Rhodesia) ; (25) *T. bilineolata* (Serville) (Angola) ; (26) *T. bilineolata* (Serville) (large Madagascan form) ; (27) *T. bilineolata* (Serville) (small Madagascan form) ; (28) *T. fissa* sp. n. ; (29) *T. brevis* sp. n. ; (30) *T. ampla* sp. n. ; (31) *T. continua* (Walker) ; (32) *T. rubrescens* Kirby ; (33) *T. gracilis* Chopard.

17 Lateral pronotal lobes shaped as in Text-figs. 21 or 22. (Not known from South Africa or Madagascar) . . . . ***T. irregularis*** Karsch (p. 306)
– Lateral pronotal lobes not shaped as in Text-figs. 21 or 22, or, if somewhat similar (Text-fig. 26), from South Africa or Madagascar . ***T. bilineolata*** (Serville) (p. 309)
18 Subgenital plate simply triangular, as in Text-figs. 47 and 48 ***T. continua*** (Walker) (p. 316)
– Subgenital plate not simply triangular, as in Text-figs, 39–42, 45 and 46 . . 19
19 Subgenital plate with small well-developed lateral lobes, as in Text-fig. 39 ***T. dispar*** Sjöstedt (p. 309)
– Subgenital plate not as in Text-fig. 39 ; lateral lobes, if present, large and broad . 20
20 Subgenital plate with lateral lobes, as in Text-figs. 45 and 46. Lateral pronotal lobes relatively deep, as in Text-fig. 30 . . . . . ***T. ampla*** sp. n. (p. 315)
– Subgenital plate without lateral lobes, as in Text-figs. 40–42. Lateral pronotal lobes less deep, as in Text-figs. 24–27 . . . . . ***T. bilineolata*** (Serville) (p. 309)



FIGS. 34–49. Lateral view of the subgenital plate and basal region of the ovipositor of (34) *Tylopsis lilifolia* (Fabricius) ; (35) *T. lilifolia* (Fabricius) (deserticolous form) ; (36) *T. irregularis* Karsch (Mali) ; (37) *T. irregularis* Karsch (Uganda : "Karamoja") ; (38) *T. irregularis* Karsch (Uganda : Agaya Lango) ; (39) *T. dispar* Sjöstedt ; (40) *T. bilineolata* (Serville) (Tanganyika) ; (41) *T. bilineolata* (Serville) (Southern Rhodesia) ; (42) *T. bilineolata* (Serville) (Transvaal) ; (43) *T. fissa* sp. n. ; (44) *T. brevis* sp. n. ; (45) *T. ampla* sp. n. (Angola) ; (46) *T. ampla* sp. n. (Northern Rhodesia) ; (47) *T. continua* (Walker) (Southern Rhodesia) ; (48) *T. continua* (Walker) (Northern Rhodesia) ; (49) *T. rubrescens* Kirby.

DESCRIPTIONS OF THE SPECIES

1. ***Tylopsis lilifolia*** (Fabricius, 1793)
(Text-figs. 1, 2, 18, 19, 34, 35)

[*Locusta thymifolia* Fabricius, Petagna, 1792 : 313. (Misidentification.)]
Locusta lilifolia Fabricius, 1793 : 36. Type locality : Italy. Type-material lost.
Locusta gracilis Germar, 1817 : 251. Holotype ♀, Yugoslavia : Zadar (*Germar*) (lost).
Locusta liliifolia Rambur, 1838 : 44. (Unjustified emendation.)
Tylopsis lilifolia (Fabricius), Fieber, 1853 : 173.
Phaneroptera praeusta Fischer de Waldheim, 1846 : 142. Holotype ♀, U.S.S.R.: Azerbaijan, Kirovabad (*Kolenati*) (lost).
Centrophorus spinosus Fischer de Waldheim, 1846 : 362. Unknown number of nymphal syntypes of both sexes, U.S.S.R.: Crimea (*Motschulsky*) (lost).
Phaneroptera margineguttata Serville, 1839 : 422. 1 ♂ syntype, Sardinia (*Géné*) ; 1 ♂ syntype, Sicily (*Latreille*) (both lost).
? *Tylopsis coi* Jannone, 1936 : 147. Holotype ♂, Dodecanese : Kos, Linopoti Marsh, 10.ix.1934 (*Jannone*) (Instituto e Laboratorio di Entomologia Agraria, Portici). (See below.)
Locusta lilifolia Fabricius, Hemming, 1954 : 644. (Addition to Official List.)

Diagnosis. ♂ ♀. Lateral pronotal lobes as in Text-figs. 18 and 19. Male cerci as in Text-figs. 1 and 2. Female subgenital plate with well-developed lateral lobes, as in Text-fig. 34, or simply triangular, as in Text-fig. 35.

Measurements.

	Males	Females
Total length	(20) : 21·1–38·7, mean 30·83	(20) : 24·2–37·9, mean 33·26
Median length of pronotum	(20) : 2·5– 4·3, mean 3·49	(20) : 3·3– 4·2, mean 3·72
Length of hind femur	(20) : 20·0–26·9, mean 22·90	(20) : 22·4–28·0, mean 24·43
Length of fore wing	(20) : 15·2–24·9, mean 19·68	(20) : 18·6–24·1, mean 21·28
Length of ovipositor		(20) : 4·3– 5·3, mean 4·94

Discussion. This is the only species of the genus in southern Europe and the Levant. In parts of North Africa and Arabia, however, it overlaps in range with *T. irregularis* Karsch ; it may be readily distinguished from that species by the shape of the lateral pronotal lobes, which lack a produced posteroventral angle.

The material I have examined from Algeria, Libya, southern Jordan and the Arabian Peninsula differs in several respects from material from the remaining parts of the range. The insects are usually smaller, the male cerci are more attenuate at the tip (Text-fig. 2), and the lateral lobes normally characteristic of the female subgenital plate are completely lacking (Text-fig. 35) ; also, the lateral pronotal lobes tend to be more angular (Text-fig. 19). When further material becomes available it will doubtless be advisable to regard this form as a distinct subspecies ; it may even prove to be specifically distinct from *T. lilifolia* (Fabricius). The material at present available is, however, quite inadequate for a definite conclusion to be drawn, and for the time being it is better to regard the specimens from these southerly parts of the range as belonging to a deserticolous form of *T. lilifolia* (Fabricius).

The type-material of *T. coi* Jannone was unfortunately not available for study, but it seems very probable from the well illustrated original description that this name is a synonym of *T. lilifolia* (Fabricius). This cannot be established with certainty, however, in the absence of the holotype.

MATERIAL EXAMINED. A large quantity of material of this species was available for study and, as it is a comparatively well-known insect, exact locality data are given below only for material from countries through which the boundary of its range passes or in which the extent of its distribution is very poorly known. The remaining countries and islands are listed without further details (see also general remarks on p. 298).

PORTUGAL ; SPAIN ; FRANCE : Haute-Garonne, 15 Km. N. of Toulouse, Beauxelle, 1 ♀, viii ; Pyrénées-Orientales, nr. Banyuls-sur-Mer, 4 ♂, 8 ♀, ix ; P.-O., nr. Le Perthus, 1 ♀, ix ; P.-O., Vernet les Bains, 3 ♂, 2 ♀, viii ; Hérault, Palavas les Flots, 1 ♂, viii ; Aude, Narbonne-plage, 1 ♂, viii ; Bouches-du-Rhône, Petit Camargue, Les Stes. Maries, 1 ♀, viii ; Arles, Fourques, 1 ♀, ix ; Provence, Croix Valmer, 3 ♂, 2 ♀, viii ; P., St. Tropez, 1 ♂, viii ; Var, Ste. Maxime distr., 1 ♂, 1 ♀, viii–ix ; V., La St. Baume, 1 ♂, 1 ♀, ix ; Alpes-Maritimes, nr. Villefranche-sur-Mer, 4 ♂, ix ; A.-M., Cagnes, 1 ♂, viii–ix ; A.-M., Biot, c. 800 ft., 9 ♂, 3 ♀, viii ; CORSICA ; ITALY : Liguria, Portofino, Vetta, 450 m., 1 ♀, ix ; L., Chiavari, 1 ♂, ix ; Rome, 2 ♂, 4 ♀ ; Apuan Alps, Camalore Lombrici, 100 m., 1 ♂, 3 ♀, ix ; Apulia, Leuca, 40 m., 1 ♀, ix ; Emilia, Classe de Ravenna, 1 ♂, viii ; Basilicata, Venosa, 420 m., 2 ♀, ix ; Molveno, 1 ♀, viii ; Taranto, 1 ♀ ; YUGOSLAVIA ; GREECE ; TURKEY ; CYPRUS ; SYRIA : Jisr Banat, Yacoub, 2 ♀, vii ; Jebel Mazar, Lake, 1 ♂, 1 ♀, vii ; Hameh, 1 ♂, vi ; Samakh, 1 ♀, v ; LEBANON : nr. Baalbek, 1 ♂, vii ; Amioun, 1 ♂, 1 ♀, viii ; Wadi el Harir, 2 ♂, vii ; ISRAEL : Haifa, 1 ♂, 1 ♀, vii ; Nazareth, 1,200 ft., 1 ♀, vi ; Beisan, 2 ♀, vi ; JORDAN : Kukum, Tul Karem, 2 ♂, vi ; Samaria, Marj Samour, 1 ♂, vi ; 23 Km. W. of Amman, nr. El Salt, 3 ♂, 4 ♀, vi ; Wadi Zerka, Jerash Rd., 1 ♀, vi ; Damiya, 280 m., 1 ♀, iv ; EGYPT : ———, 1 ♀ ; Tul Keram, 1 ♂, x.

Deserticolous form (see p. 305). JORDAN : Petra, 2 ♀, vi ; ARABIA : El Kubar, 2 ♂ ; LIBYA : Cyrenaica, Slonta, Jebel Akhdar, 1 ♂, 1 ♀, vii ; ALGERIA : Ain Sefra, 1 ♂ (Nat. Mus. Vienna).

In Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. The range of this species covers most of the Mediterranean Region and extends northwards into the southernmost parts of European Russia.

2. *Tylopsis irregularis* Karsch, 1893
(Text-figs. 3, 17, 20–22, 36–38)

Tylopsis irregularis Karsch, 1893 : 130. Lectotype ♂, TOGO : Bismarckburg (Zool. Mus. Berlin) [examined].

Tylopsis perpulchra Burr, 1900 : 43. Holotype ♂, SOMALI REPUBLIC : Whardi Datal (Univ. Mus. Oxford) [examined]. **Syn. n.**

Tylopsis obscuripes Chopard, 1945 : 166. Lectotype ♂, CAMEROUN : Bambouto Mtns. (Mus. Hist. Nat. Paris) [examined]. **Syn. n.**

Tylopsis villiersi Chopard, 150 : 133. Lectotype ♂, NIGER : Agadès (Mus. Hist. Nat. Paris) [examined]. **Syn. n.**

Tylopsis lamottei Chopard, 1954 : 42. Lectotype ♂, GUINEA : Nimba, Serengbara (Mus. Hist. Nat. Paris) [examined]. **Syn. n.**

Diagnosis. ♂ ♀. Lateral pronotal lobes with produced posteroventral angle, as in Text-figs. 20–22. Male cerci markedly undulate at apex, as in Text-fig. 3. Female subgenital plate with or without lateral lobes, as in Text-figs. 36–38.

MEASUREMENTS.

	MALES	FEMALES
Total length	(20) : 38·7–47·6, mean 43·40	(20) : 36·8–48·7, mean 43·41
Median length of pronotum	(20) : 3·1– 4·1, mean 3·67	(20) : 3·1– 4·2, mean 3·65
Length of hind femur	(20) : 22·4–29·3, mean 25·48	(20) : 23·1–27·6, mean 25·66
Length of fore wing	(20) : 25·7–31·7, mean 28·69	(20) : 24·7–32·7, mean 28·97
Length of ovipositor		(20) : 4·6– 6·8, mean 5·22

DISCUSSION. The shape of the lateral pronotal lobes and the strongly undulate tips of the male cerci enable this species to be quite easily distinguished from the other members of the genus. It is by far the most common and widespread species of *Tylopsis* Fieber in West Africa, and seems in fact to be the only species in much of this region.

All the females examined from west of the Adamawa Highlands had subgenital plates with well-developed lateral lobes (Text-figs. 36 and 37). In the East African material, however, these lobes were almost always lacking or at the most very poorly developed ; the Congolese material showed a mixture of the two types, and this was also true of the Arabian females. The characteristic shape of the lateral pronotal lobes and of the male cerci is fairly constant throughout the range. It is impossible to be certain from the material at present available whether this difference in the shape of the female subgenital plate (which parallels the similar difference shown by *T. lilifolia* (Fabricius) (see p. 305)) is due to geographical variation or polymorphism. The overlap in range of the two types that seems to occur in the Congo Republic, in Uganda (a female from " Karamoja " is of the West African type) and in Arabia suggests polymorphism, with a pronounced tendency towards allopatry by the two polymorphs, but this question cannot be settled definitely until more material is available.

Examination of the type-specimens of *T. perpulchra* Burr, *T. obscuripes* Chopard, *T. villiersi* Chopard and *T. lamottei* Chopard has shown that they are conspecific with the type-material of *T. irregularis* Karsch.

I have selected and labelled a male lectotype from each of the following type-series :—

T. irregularis Karsch, 5 ♂ and 4 ♀ syntypes
T. obscuripes Chopard, 1 ♂ and 1 ♀ syntypes
T. villiersi Chopard, 1 ♂ and 1 ♀ syntypes
T. lamottei Chopard, 1 ♂ and 1 ♀ syntypes.

MATERIAL EXAMINED.

Lectotype. TOGO : Bismarckburg, ♂, 1.xi–15.xii.1890 (*Büttner*) (Zool. Mus. Berlin).

Paralectotypes. TOGO : Bismarckburg, 1 ♂, 1 ♀ (*Büttner*) (Zool. Mus. Berlin) ; Bismarckburg, 3 ♂, 3 ♀, i.1891 (*Büttner*) (Zool. Mus. Berlin).

MOROCCO : Od. Cherrat, 2 ♂, ix ; SENEGAL : Richard Toll, 1 ♀, ix (I.F.A.N. Dakar) ; MALI : Middle Niger, Diafarabe, 1 ♂, ix ; Dioura, 1 ♀, x ; GUINEA : Nimba, Serengbara, 1 ♂, ii–vi.1942 (*Lamotte*) (Mus. Hist. Nat. Paris) (lectotype of *T. lamottei* Chopard) ; Nimba, Keoulenta, 1 ♀, ii–iv.1942 (*Lamotte*) (Mus. Hist. Nat. Paris) (paralectotype of *T. lamottei* Chopard) ; Nimba, Ziéla, 7 ♂, 8 ♀, xii–v (Mus. Hist. Nat. Paris) ; Nimba, 2 ♂, 1 ♀, iii (Mus. Hist. Nat. Paris) ; Friguiagbé, nr. Kindia, 4 ♂ (Mus. Hist. Nat. Paris) ; SIERRA LEONE : Njala, 2 ♀, v–x ; LIBERIA : ———, 1 ♂ ; IVORY COAST : Dimbokro [" Dimbroko "], 1 ♂, 1 ♀ (Inst. Esp. Ent.) ; Lamto, Toumodi, 1 ♂, 4 ♀, iii–x ; GHANA : between Takoradi and Axim, 1 ♀, vii–ix ; TOGO : Bismarckburg, 1 ♂, 2 ♀, i (Nat. Mus. Vienna) ; ———, 1 ♂ (Inst. Esp. Ent.) ; DAHOMEY : Porto-Novo, 1 ♂, 1 ♀ (Mus. Hist. Nat. Paris) ; Parakou and Nikki, 1 ♂ (Mus. Hist. Nat. Paris) ; NIGER : Agadès, 1 ♂, 1 ♀, 1947 (*Chopard & Villiers*) (Mus. Hist. Nat. Paris) (lectotype and paralectotype of *T. villiersi* Chopard) ; NIGERIA : Azare, 4 ♂, 3 ♀, x–vi ; Gombe, Matyoro Lakes, 1 ♀, i ; Calabar, 1 ♂, ii ; Ibadan, 1 ♂, 1 ♀, ii–iii ; Zaria, 1 ♂, xi ; nr. Lagos, 1 ♀, i ; Niger Province, Abuja, 1 ♂, 1 ♀, vi–vii ; N.P., Minna, 2 ♀, ix–xi ; N.P., Diko, 2 ♂, 2 ♀, xii–i ; Benue Province, Abayol, nr. Gboko, 1 ♀, i ; B.P., Takum, 1 ♀, i ; Kabba Province, Lokoja, 1 ♂, 1 ♀, ix–v ; Kabba, 1 ♂, 4 ♀, ii ; Bauchi Province, Udubo, 1 ♀, xii–i ; CHAD : N'Gouri, Kanem distr., 1 ♂, ix (Mus. Af. Cent.) ; South Dar-Banda, Krebedje, Fort Sibut, 1 ♂, xi (Mus. Hist. Nat. Paris) ; Baguirmi, Tcheckna, 1 ♀, viii (Mus. Hist. Nat. Paris) ; CAMEROUN : Bambouto Mtns., 2,300–2,500 m., 1 ♂, vii.1939 (*Lepesme, Paulian & Villiers*) (Mus. Hist. Nat. Paris) (lectotype of *T. obscuripes* Chopard) ; Bambouto Mtns., 2,000 m., 1 ♀, vii.1939 (*Lepesme, Paulian & Villiers*) (Mus. Hist. Nat. Paris) (paralectotype of *T. obscuripes* Chopard) ; CONGO (ex French) : Grand Lahou, 1 ♂ (Mus. Hist. Nat. Paris) ; CONGO REPUBLIC : Kivu, 1 ♂ (Mus. Af. Cent.) ; K., Buserengenye (Rutshuru), 1 ♀, ix (Mus. Af. Cent.) ; Thysville, 1 ♂ (Mus. Af. Cent.) ; Katanga, 1 ♂ (Mus. Af. Cent.) ; Ubangi, Jacoma, 1 ♂, 1 ♀ (Mus. Af. Cent.) ; Ituri, Aru, 1 ♀ (Mus. Af. Cent.); Kibali-Ituri, Domu, 1 ♀, ii–iii (Mus. Af. Cent.) ; K.-I., Aru, 1 ♀ (Mus. A.f Cent.) ; Brabanta (Basongo), 1 ♂, iv–v (Mus. Af. Cent.) ; Garamba National Park, 11 ♂, 7 ♀, xi–iii (Inst. Parcs Nat. Brussels) ; RUANDA : Kinazi, Terr. Nyanza, 1,600 m., 1 ♂, 2 ♀, i (Mus. Af. Cent.) ; Astrida, 3 ♀, vii–x (Mus. Af. Cent.) ; ARABIA : Shaira, 19° 27′ N., 41° 6′ E., 1 ♂, 1 ♀, i ; Mecca, 2 ♂, iii ; Lith, 1 ♀, ii ; Hejaz, Jidda, 1 ♀, ii ; ETHIOPIA : Ogaden, Wardere, 1 ♂, xii ; Hawash R., W. of Mt. Zaquála, c. 6,000 ft., 2 ♀, xi ; Jimma, 7° 39′ N., 36° 49′ E., 1,779 m., 2 ♂, 1 ♀, i (Staatl. Mus. Nat. Stuttgart) ; ———, 1 ♀ (Mus. Hist. Nat. Paris) ; Eritrea, 1 ♂ (Nat. Mus. Vienna) ; SOMALI REPUBLIC : Whardi Datal, 1 ♂, 26.vii.1895 (*Peel*) (Univ. Mus. Oxford) (holotype of *T. perpulchra* Burr) ; UGANDA : Karamoja, 1 ♀, xi ; Lango, Aduku, 1 ♂, vii ; Butiaba, 1 ♂, ix ; Kepeka, 4 ♂, vii–x ; Bulemezi, Nakasongola, 2 ♂, xi ; Wakyato, 1 ♂, vii ; Agaya Lango, 1 ♂, 2 ♀, xi ; Lwengo, Buddu, 1 ♂, vii ; L., Masaka, 1 ♂, 1 ♀, v ; Buruli, 1 ♂, vii ; Koki, Lwanda, 1 ♀, i ; Bugwere, 1 ♀, x ; Lango, Amugo, 1 ♀, vii ; Tororo Hills, 1 ♂, 1 ♀, v ; 27 miles N. of Murchison

Falls, 1,050 m., 1 ♂, viii (Cal. Acad. Sci.) ; KENYA : Nairobi, 3 ♂, 1 ♀, xi–vi ; Chyulu Hills, 1 ♀, vii ; Samburu, 2 ♀ ; TANGANYIKA : Malagarasi, 1 ♂, viii ; north-west, 1 ♀ (Nat. Mus. Vienna) ; ANGOLA : Morro de Pundo, 1 ♀, v ; Amboim, 1 ♀, iv ; SOUTH WEST AFRICA : Damaraland, 1 ♀ (Nat. Mus. Vienna).

In Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. This species is distributed throughout tropical Africa, and extends northwards into Morocco and Arabia.

3. *Tylopsis dispar* Sjöstedt, 1909
(Text-figs. 4, 23, 39)

Tylopsis dispar Sjöstedt, 1909 : 135. Lectotype ♂, TANGANYIKA : Mt. Meru, Ngare na nyuki (Nat. Riksmus. Stockholm) [examined].

DIAGNOSIS. ♂ ♀. Lateral pronotal lobes as in Text-fig. 23. Male cerci as in Text-fig. 4, not undulate at apex when viewed from above. Female subgenital plate with well-developed lateral lobes, as in Text-fig. 39.

MEASUREMENTS.

	MALES	FEMALES
Total length	(6) : 37·4–39·8, mean 39·05	(3) : 36·8–39·4, mean 38·50
Median length of pronotum	(6) : 3·2– 3·4, mean 3·29	(3) : 3·0– 3·2, mean 3·11
Length of hind femur	(6) : 21·1–23·4, mean 22·03	(3) : 20·5–26·1, mean 21·97
Length of fore wing	(6) : 24·2–26·0, mean 25·15	(3) : 25·1–26·1, mean 25·70
Length of ovipositor		(3) : 5·1– 5·2, mean 5·14

DISCUSSION. The male of this species may be easily recognized by the cerci, which are not undulate when viewed from above, not bent back near the apex, and not finely pointed. The female may be distinguished from the other East African species of the genus by the shape of the subgenital plate and the lateral pronotal lobes.

I have selected and labelled a male lectotype from the nine male and six female syntypes of this species. All these syntypes are from the lectotype locality except for one male with the following data—TANGANYIKA : Kilimanjaro, Kibonoto, xii.1905 (*Sjöstedt*).

MATERIAL EXAMINED.

Lectotype. TANGANYIKA : Mt. Meru, Ngare na nyuki, ♂, i.1906 (*Sjöstedt*) (Nat. Riksmus. Stockholm).

Paralectotypes. TANGANYIKA : Mt. Meru, Ngare na nyuki, 3 ♂, 3 ♀, x–xii.1905 (*Sjöstedt*) (1 ♂, 1 ♀ in Brit. Mus. (Nat. Hist.) ; remainder in Nat. Riksmus. Stockholm).

KENYA : Mtito Andei, nr. Lushoto, 1 ♂, 10.ii.1955 (*Haskell*) (Brit. Mus. (Nat. Hist.)) ; Bura, 1 ♂, iii.1912 (*Alluaud & Jeannel*) (Inst. Esp. Ent.).

4. *Tylopsis bilineolata* (Serville, 1839)
(Text-figs. 5, 24–27, 40–42)

Phaneroptera bilineolata Serville, 1839 : 419. Holotype ♂, SOUTH AFRICA : Cape of Good Hope (lost).

Phaneroptera attenuata Walker, 1869 : 338. Holotype ♀, SOUTH AFRICA (Brit. Mus. (Nat. Hist.)) [examined].

Tylopsis marginata Brunner, 1891 : 113. Holotype ♀, SOUTH AFRICA : Durban (Nat. Mus. Vienna) [examined].

DIAGNOSIS. ♂ ♀. Lateral pronotal lobes as in Text-figs. 24–27. Male cerci as in Text-fig. 5, apex reflexed and finely pointed when viewed from above. Female subgenital plate as in Text-figs. 40–42, with median point or truncate, sometimes showing slight indication of lateral lobes.

MEASUREMENTS.

	MALES	FEMALES
Total length	(20) : 38·3–48·8, mean 43·88	(20) : 40·2–52·0, mean 45·82
Median length of pronotum	(20) : 3·5– 4·1, mean 3·76	(20) : 3·4– 4·3, mean 3·74
Length of hind femur	(20) : 23·7–29·5, mean 26·28	(20) : 23·0–29·3, mean 26·80
Length of fore wing	(20) : 24·6–32·1, mean 29·00	(20) : 25·8–35·6, mean 30·48
Length of ovipositor		(20) : 4·9– 6·0, mean 5·28

Small Madagascan form (see below)

	MALES	FEMALES
Total length	(10) : 30·6–34·4, mean 32·08	(10) : 27·7–35·4, mean 31·21
Median length of pronotum	(10) : 3·0– 3·7, mean 3·29	(10) : 3·0– 3·7, mean 3·35
Length of hind femur	(10) : 18·0–23·0, mean 19·60	(10) : 17·3–23·3, mean 19·74
Length of fore wing	(10) : 19·1–21·3, mean 20·07	(10) : 17·8–22·3, mean 19·99
Length of ovipositor		(10) : 4·2– 4·8, mean 4·52

DISCUSSION. The shape of the male cerci of this species is approached only by that of the deserticolous form of *T. lilifolia* (Fabricius) (p. 305), which, however, does not occur in Africa south of the Sahara. The subgenital plate of the female could be confused only with that of *T. irregularis* Karsch, from which *T. bilineolata* (Serville) may be distinguished in Tanganyika, where the ranges of the two species probably overlap, by the shape of the lateral pronotal lobes.

The large amount of Madagascan material that was available for this study has been rather difficult to assess taxonomically. It falls into two fairly distinct groups : a large form (total length about 40–45 mm.) and a small form (total length about 30 mm.) ; a few specimens are intermediate in size. Apart from the size difference these two forms resemble each other closely ; the male cerci and female subgenital plate are very similar, and it is only the pronotum that shows an appreciable difference (see Text-figs. 26 and 27). Taken together and compared with the species of *Tylopsis* Fieber that occur on the adjacent part of the African mainland, the two forms agree very well with *T. bilineolata* (Serville) in the shape of the male cerci and female subgenital plate (and, in the case of the large form, in size), though the pronotum of both large and small forms shows some difference (see Text-figs. 24–27). I have therefore chosen to regard the Madagascan material as consisting of slightly modified forms of the present species ; the large and small forms may have resulted from two immigrations by the African population of *T. bilineolata* (Serville) at widely separated times.

MATERIAL EXAMINED.

CONGO REPUBLIC : Sankuru, Gandajika, 4 ♀, vii–x (Mus. Af. Cent.) ; Gandajika, 4 ♀, x (Mus. Af. Cent.) ; Katanga, Lubumbashi, 1 ♀ (Mus. Af. Cent.) ; K., Kansenia, 4 ♂, ix (Mus. Af. Cent.) ; K., Kafakumba, 1 ♀, ix (Mus. Af. Cent.) ; K., Kolwezi, 1 ♂, xi (Mus. Af. Cent.) ; K., 1 ♀ (Mus. Af. Cent.) ; K., 1 ♀, xi–xii ; Elisabethville, 1 ♀, x (Mus. Af. Cent.) ; Kabinda, 1 ♀ (Mus. Af. Cent.) ; ANGOLA : Lunda, Dundo, 1 ♂, vii (Mus. Dundo) ; 40 Km. S.S.E. of Dundo, 2 ♀, vii (Mus. Dundo) ; Caluango, R. Caquele, 1 ♂, 1 ♀, ix (Mus. Dundo) ; Caluango, between R. Caquele and R. Luange, 1 ♀, ix (Mus. Dundo) ; Cuangula Post, Zovo, Mabete, banks of R. Combonde, 8° 03′ S., 18° 13′ E., 750 m., 1 ♀, vii (Mus. Dondo) ; Cuilo Post, Xá-Ua, nr. R. Luita, 8° 02′ S., 19° 25′ E., 1,000–1,050 m., 1 ♀, vii (Mus. Dundo) ; Luchase distr., R. Quangu, 5,000 ft., 1 ♀, x ; L. distr., R. Quangu, 2 ♂, 1 ♀, x ; Moxico distr., R. Lungue Bungu, 3 ♂, x ; M. distr., valley of R. Mu-Simoj, 3 ♂, 3 ♀, x ; M. distr., upper Mu-Simoj R., 5 ♂, ix ; Bihe distr., Cohemba, 1,330 m., 2 ♀, viii ; Quanza, 1 ♂, ix (Inst. Esp. Ent.) ; TANGANYIKA : Bukoba, Bugese, 1 ♂, vi ; Ufipa, Sambawanga, 2 ♀, xi ; Tukuyu, 5,084 ft., 1 ♂, 1 ♀, ix ; Matengo Highlands, W.S.W. of Songea, Mbinga, 1 ♀, xi (Nat. Mus. Vienna) ; NORTHERN RHODESIA : Lusaka, 2 ♂, 2 ♀, x–xii ; 6 miles E. of Lusaka, 1 ♀, ix–xi ; Chisinga Plateau, Kalungwisi distr., 1,500 ft., 1 ♂, ix (Univ. Mus. Oxford) ; SOUTHERN RHODESIA : Gazaland, Mahakata R., 5,000 ft., 2 ♂, ix–x (Univ. Mus. Oxford) ; G., Mt. Chirinda, 1 ♂, xi–xii ; Mashonaland, Salisbury, 2 ♀, xii ; Salisbury, Hatfield, 1 ♀, x ; Salisbury, 1 ♀, xi (S. A. Mus.) ; Turk Mine, 3 ♀, x (Nat. Mus. S. R.) ; Inyanga, 1 ♂, i (Nat. Mus. S. R.) ; Vumba Mtns., 1 ♂, xi (Transvaal Mus.) ; NYASALAND : Zomba, 1 ♀ ; MOZAMBIQUE : Revoué Valley, nr. Andrada, 1 ♂, x (Mus. Hist. Nat. Paris) ; SOUTH AFRICA : ———, 1 ♀ (holotype of *Phaneroptera attenuata* Walker) ; Durban, 1 ♀ (*Staudinger*) (Nat. Mus. Vienna) (holotype of *Tylopsis marginata* Brunner) ; Cape Province, Fish Hoek Valley, 1 ♂, xi–iii ; Barberton, 3 ♀ ; Somerset West, 1 ♀ (S.A. Mus.) ; Cape Town, 1 ♂, iv (Transvaal Mus.) ; Grootdraai, Olifants R., 1 ♀, x (Transvaal Mus.) ; Rustenburg, 1 ♀, x (Transvaal Mus.) ; Johannesburg, 1 ♀, x ; MADAGASCAR : Toalala, Reserve VIII, 1 ♂ (Inst. Sci. Madag.) ; Ampijoroa, Ankarafantsika, 170 m., 1 ♀, i (Inst. Sci. Madag.) ; Ampijoroa, Tsaramandroso, 2 ♀ (Inst. Sci. Madag.) ; Ambohimanakana, Manambato (Anove), 1 ♂ (Inst. Sci. Madag.) ; Andobo, Antsingy Forest, Antsalova, 190 m., 1 ♀, ii (Inst. Sci. Madag.) ; Farafangana, Midongy, 600–1,000 m., 1 ♀, viii (Mus. Hist. Nat. Paris) ; Analalava, Maromandia, 1 ♂, 1 ♀, iii (Mus. Hist. Nat. Paris) ; Andampy Forest, 60 Km. S.W. of Vohemar, 1 ♂ (Mus. Hist. Nat. Paris) ; Forest of Ambre and Maevatanana, 1 ♂ (Mus. Hist. Nat. Paris) ; Ambovombe, 3 ♂, 3 ♀ (Mus. Hist. Nat. Paris) ; Ampasindava Bay, 1 ♀, xi (Mus. Hist. Nat. Paris) ; Ankazoabo, 1 ♀ (Mus. Hist. Nat. Paris) ; Ivondro, 1 ♀, vii (Mus. Hist. Nat. Paris) ; Nosy-Komba, 1 ♀, v (Inst. Sci. Madag.) ; Tsivory, 1 ♂, 1 ♀ (Mus. Hist. Nat. Paris) ; Fainarantsoa, Ranomafana, 1 ♂, i (Nat. Mus. Basle) ; Tamatave, Soanierana-Ivongo, 1 ♀, xi (Nat. Mus. Basle) ; Tamatave, Antanambe, 1 ♂, xi (Nat. Mus. Basle) ; Tamatave, Moramanga, 1 ♂, xii (Nat. Mus. Basle) ; Ambohimitombo Forest, 1 ♀, xi ; Ambinanindrano, 1 ♂ (Univ. Mus. Oxford) ; Antongil, 2 ♂ (Nat. Mus. Vienna) ; Andrangoloka, 1 ♂ (Nat. Mus. Vienna) ; Ampandrandave, 10 ♂, 2 ♀, xii–i (Inst. Esp. Ent.) ; Sakavondro, Fort Dauphin, 40 m., 1 ♀, vi (Inst. Sci. Madag.) ; Lake Iotry, Morombe, 40 m., 1 ♂, 1 ♀, vii (Inst. Sci. Madag.) ; Ankadimanga, Menjakandriana, 1 ♂, xii (Inst. Sci. Madag.) ;

Tananarive, Ambohitantely, 1 ♀, xi (Nat. Mus. Basle) ; Tananarive, 1 ♂, 2 ♀, x–xii (Cal. Acad. Sci.) ; Tananarive, 1 ♂ (Mus. Hist. Nat. Paris).

Small Madagascan form (see p. 310). MADAGASCAR : Soaindrana Plateau, Andringitra-Ambalavao, 2,090 m., 9 ♂, 7 ♀, i (Inst. Sci. Madag.) ; Vakoana Forest, Ambalamarovandana, Andringitra-Ambalavao, 1,530 m., 1 ♂, 1 ♀, i (Inst. Sci. Madag.) ; Amboasary, Ambovombe, 220 m., 1 ♂, vi (Inst. Sci. Madag.) ; Andrangoloka, 5 ♂, 1 ♀ (Nat. Mus. Vienna).

In Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. The range of this species covers most of Africa south of the equator (though it is not yet known from South West Africa or Bechuanaland), and Madagascar.

5. ***Tylopsis fissa* sp. n.**

(Text-figs. 6, 15, 28, 43)

DIAGNOSIS. ♂ ♀. Lateral pronotal lobes as in Text-fig. 28. Male cerci as in Text-fig. 6. Female subgenital plate as in Text-fig. 43, with deep median incision at apex.

DESCRIPTION. ♂. Fastigium of vertex compressed, sulcate above, concave in profile, with narrow anterior point.

Pronotum without lateral carinae, lateral lobes shaped as in Text-fig. 28. Fore coxae with well-developed spine. Fore tibiae with about 5–8 external ventral spurs. Mid tibiae with about 11–15 external ventral spurs. Hind femora unarmed. Hind tibiae with about 25–40 external dorsal spines. Hind wings extending beyond fore wings by about third length of latter.

Tenth abdominal tergite unmodified. Supra-anal plate triangular. Cerci as in Text-fig. 6. Subgenital plate with median apical incision.

General coloration usually green, sometimes with red-brown spots on top of head, pronotum and hind femora, and on abdominal tergites ; antennae, tibiae and hind femora red-brown or with red-brown markings ; tibial spines and spurs with dark tip ; fore wings with red-brown band along anterior and posterior margins, and blackish spot at base of *C* ; left fore wing with blackish spot on stridulatory rib (Cu_2) ; cerci with dark tip. Occasionally all brown, in which case there is usually dark median stripe on pronotal disc and dark spots on fore wings, especially in radial area.

♀. As male except for fore wings and genitalia. Subgenital plate as in Text-fig. 43, with deep median incision at apex. Red-brown markings of green variety often much less in in evidence than in male, and sometimes absent.

MEASUREMENTS.

	MALES	FEMALES
Total length	(20) : 34·9–42·9, mean 39·44	(20) : 32·6–42·8, mean 38·28
Median length of pronotum	(20) : 3·5– 3·9, mean 3·67	(20) : 3·4– 4·0, mean 3·71
Length of hind femur	(20) : 20·1–23·9, mean 21·84	(20) : 20·3–25·4, mean 22·76
Length of fore wing	(20) : 24·1–29·4, mean 27·07	(20) : 22·9–30·0, mean 26·52
Length of ovipositor		(20) : 5·5– 7·7, mean 6·15

VARIATION. The lateral pronotal lobes vary a little in shape. There is variation in the number of tibial spines and spurs, especially the dorsal spines of the hind tibiae. The relative length of the fore wings varies appreciably, some of the Congolese specimens having noticeably shorter wings than usual ; there is similar variation in the relative length of the legs and, in the female, of the ovipositor.

Discussion. The nature of the female subgenital plate, with its deep median split, is unique in the genus. The male is less easily recognized, but may be distinguished from the males of the other East African species by the shape of the cerci and lateral pronotal lobes, taken in combination ; the small blackish spot on the stridulatory rib of the left fore wing is also quite characteristic, though this feature is often also shown by the Madagascan form of *T. bilineolata* (Serville).

T. fissa sp. n. seems to be the most common species of the genus in Uganda, Ruanda, Urundi, and the extreme east of the Congo Republic, though *T. irregularis* Karsh occurs more sparsely in all these areas.

Material examined.

Holotype. Uganda : Entebbe, ♂, 9.viii.1911 (*Gowdey*).

Paratypes. Uganda : Entebbe, 2 ♂, 4 ♀, 19–26.viii.1911 (*Gowdey*) ; Entebbe, 1 ♂, 12.vi.1913 (*Gowdey*) ; Entebbe, 1 ♂, 1 ♀, 15–22.vi.1912 (*Gowdey*) ; Entebbe, 1 ♂, 13–17.i.1913 (*Gowdey*) ; Entebbe, 1 ♂, 15.xi.1910 (*Gowdey*) ; Entebbe, 1 ♂, 2 ♀ (*Gowdey*) ; Entebbe, 1 ♀, 28.vii.1933 (*Johnston*) ; Manataba Forest, 1 ♂, 9.ix.1933 (*Johnston*) ; Kampala, 1 ♂, 21.ii.1933 (*Johnston*) ; Kampala, 1 ♂, 20.iii.1933 (*Johnston*) ; Kampala, 1 ♀, 10.vii.1927 (*Hargreaves*) ; Kigezi, Kashenji, 7,000 ft., hill scrub, 1 ♂, xi.1935 (*Johnston*) ; Kakumiro, 1 ♂, 16.x.1933 (*Buxton*) ; Lango, Aduku, at light, 1 ♀, 1.vii.1934 (*Johnston*) ; Beedongo, 1 ♀, 3.iii.1910 (*Gowdey*) ; Lwengo, Buddu, at light, 1 ♂, 18.vii.1935 (*Johnston*) ; Kisaru, at light, 1 ♀, 22.vi.1933 (*Johnston*) ; Hoima, 1 ♀, vi.1933 (*Johnston*) ; Lwanda, Koki, at light, 1 ♂, 15.v.1935 (*Johnston*) ; Lango, Teriri to Dokolo, seasonal swamps, 1 ♂, 24–25.vii.1935 (*Johnston*) ; Banda, Chagwe, 1 ♀, 28–29.iii.1913 (*Gowdey*) ; Kidongole, 1 ♀, 3.xii.1910 (*Gowdey*) ; Kepeka, 1 ♀, 6.vii.1933 (*Johnston*) ; Bulemezi, Nakasongola, seasonal swamp, dry season, rough tuft grass, 1 ♀, 6.xi.1935 (*Johnston*) ; Lango, Kigaa (Agaya), short grass-bush, 1 ♀, i.1933 (*Johnston*) ; Bwamba, 1 ♂, iii.1948 (*van Someren*) ; Bukalassa, 1 ♂, 1906 (*Oberthur*) (Mus. Hist. Nat. Paris) ; ————, 1 ♂ (*Bayon*) (Mus. Stor. Nat. Genoa) ; Bousoubizi, 1 ♀, xii.1909 (*Alluaud*) (Inst. Esp. Ent.) ; Toro, 1 ♀, 1909 (*Alluaud*) (Inst. Esp. Ent.) ; Ounyoro, nr. Hoima, 1 ♂, ii.1909 (*Alluaud*) (Inst. Esp. Ent.) ; Ounyoro, E. Lake Albert, 1 ♂, 1909 (*Alluaud*) (Inst. Esp. Ent.) ; Ounyoro, S.E. Lake Albert, R. Mousisi, 1 ♂, 1909 (*Alluaud*) (Inst. Esp. Ent.) ; Kampala, 1 ♂ (*Carl*) (Inst. Esp. Ent.) ; Busu Hill, Busoga, 1 ♂, 2 ♀ (*Carl*) (Inst. Esp. Ent.) ; N. of Lake Edward, 1 ♀ (*Gyldenstolpe*) (Nat. Riksmus. Stockholm) ; Sudan : Imatong Mtns., Lomuleng, 8,000 ft., 1 ♂, 1 ♀, ii.1936 (*Johnston*) ; Imatong Mtns., Loyaru, 6,700 ft., 1 ♂, ii.1936 (*Johnston*) ; Imatong Mtns., 1 ♂, 1 ♀, ii.1936 (*Johnston*) ; Kenya : Gelegele R., 1 ♂, vi.1913 (*Luckman*) ; Mt. Elgon, 2,500 m., 1 ♂, 10.iii.1926 (*Granvik*) (Zool. Inst. Lund) ; Congo Republic : Ituri, Nioka, 2 ♂, xi.1934 (*Brédo*) (Mus. Af. Cent.) ; Ituri, Nioka, 1 ♀, 20.i.1934 (*Leroy*) (Mus. Af. Cent.) ; Ituri, Lubero, 1 ♀, 1928 (*Van Riel*) (Mus. Af. Cent.) ; Ituri, Butembo, 1 ♀, xii.1928 (*Van Riel*) (Mus. Af. Cent.) ; Djugu, Ituri Forest, clear spaces in forest, 1 ♀, 6.x.1935 (*Johnston*) ; Kivu, Goma, 1 ♂, 10.ii.1937 (*Brédo*) Mus. Af. Cent.) ; Kivu, Kibati, Masisi, 1 ♀, 7.x.1949 (*Laurent*) (Mus. Af. Cent.) ; Lake Kivu, N'Gwese, 1 ♂ (*Carlier*) (Mus. Af. Cent.) ; Ruwenzori, Kalonge (Monongo), 1 ♂, vii.1937 (*Brédo*) (Mus. Af. Cent.) ; Mabende, between Beni and Rutshuru, 2,400 m., 1 ♂, xii.1935 (*Brédo*) (Mus. Af. Cent.) ; Rutshuru, 1 ♀, 8.v.1936 (*Lippens*) (Mus. Af. Cent.) ; Mahagi-Niarembe, 1 ♂, xi.1935 (*Scops*) (Mus. Af. Cent) ; Kibali-Ituri, Demu, 2 ♂, 3 ♀, ii–iii.1936 (*Pasteels*) (Mus. Af. Cent.) ; Kibali-Ituri, Kilomines, 3 ♂, 11.i.1957 (*Smoor*) (Mus. Af. Cent.) ; Volcan Sabinjo, Bunagana, 1 ♂, 1935 (*Brédo*) (Mus. Af. Cent.) ; Mulungu, 1 ♀, 1949 (*Hendrickx*) (Mus. Af. Cent.) ; Aru, dry *Acacia* bush, 1 ♂, iii.1936 (*Brédo*) ; Lado, 1,100 m., 1 ♂, x.1903 (*du Bourg de Bozas*) (Mus. Hist. Nat. Paris) ; RUANDA : Kibungu, 3 ♀, x–xii.1937 (*Verhulst*) (Mus. Af. Cent.) ; Kigali, 1 ♂, vi–vii.1933 (*Becquet*) (Mus. Af. Cent.) ; Dendezi, 1 ♂, xi.1924 (*Colbach*) (Mus. Af. Cent.) ; URUNDI : Kanyinya, 1,500 m., 1 ♀, xii.1947–i.1948 (*Dames de Marie*) (Mus. Af. Cent.).

In the Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. This species is known from Uganda, the extreme south of Sudan, western Kenya, and the highlands associated with the Albert-Edward-Kivu rift-valley. It doubtless also occurs in north-western Tanganyika.

6. *Tylopsis brevis* sp. n.

(Text-figs. 7, 14, 16, 29, 44)

DIAGNOSIS. ♂ ♀. Fore wings comparatively short and broad, with strongly convex anterior margin, as in Text-fig. 14. Dorsal spines of hind tibiae mostly large and widely spaced, as in Text-fig. 16. Lateral pronotal lobes as in Text-fig. 29. Male cerci as in Text-fig. 7. Female subgenital plate as in Text-fig. 44.

DESCRIPTION. ♂. Fastigium of vertex compressed, sulcate above, concave in profile.

Pronotum without lateral carinae, though showing slight tendency towards their formation ; lateral lobes shaped as in Text-fig. 29. Fore coxae with well-developed spine. Fore tibiae with about 5–8 external ventral spurs. Mid tibiae with about 9–11 external ventral spurs. Hind femora unarmed ; terminal lateral lobes particularly elongate. Hind tibiae with about 15–30 external dorsal spines, mostly large and widely spaced. Fore wings comparatively short and broad, with strongly convex anterior margin, as in Text-fig. 14. Hind wings extending beyond fore wings by about quarter length of latter.

Tenth abdominal tergite unmodified. Supra-anal plate triangular. Cerci as in Text-fig. 7. Subgenital plate with median apical incision.

General coloration green, with few dark brown spots on fore wings and blackish spot at base of *C*. Tibial spines and spurs with dark tip. Stridulatory region of left fore wing with conspicuous dark brown markings. Cerci with dark tip.

♀. As male except for fore wings and genitalia. Subgenital plate as in Text-fig. 44.

MEASUREMENTS.

	MALES	FEMALE
Total length	(3) : 32·9–37·3, mean 34·50	35·8
Median length of pronotum	(4) : 3·6– 3·9, mean 3·71	3·7
Length of hind femur	(3) : 18·9–20·4, mean 19·63	20·4
Length of fore wing	(3) : 21·2–24·6, mean 22·57	22·9
Length of ovipositor		5·2

VARIATION. There is variation in the number of tibial spurs. The dorsal spines of the hind tibiae vary considerably in number and may or may not be interspersed with a few much shorter spines. There is considerable variation in the relative length of the fore wings.

Discussion. The relatively short fore wings, with the strongly convex anterior margin, are unique in the genus. The shape of the subgenital plate of the single female available is also characteristic.

Material examined.

Holotype. Congo Republic : Volcan Nyamlagira, ♂, 5.i.1936 (*Brédo*) (Mus. Af. Cent.).

Paratypes. Congo Republic : Kivu, Kapanga, 1 ♂, 1952 (*Froidebise*) (Mus. Af. Cent.) ; Kivu, Masisi, 1 ♂, 1938 (*Le Moult*) (Zool. Inst. Lund) ; Rwindi, S. shore of Lake Edward, 1 ♂, 21.ix.1957 (*Ross & Leech*) (Cal. Acad. Sci.).

Also examined were a male paratype with the data " N.W. Tanganyika, Grauer, 1910 ", and a female paratype with the data " Urw. hint. d. Randbg. d. N.W. Tanganyika–S. 18–2200 m. Grauer ". It seems very likely that the second of these specimens (and possibly also the first) was collected in Urundi, while this territory was part of German East Africa ; there are no mountains reaching a height of 1,800 m. in the north-western part of present-day Tanganyika. These two specimens are in the Naturhistorisches Museum, Vienna.

Distribution. This species is known only from a small area of Central Africa in the vicinity of Lake Edward, Lake Kivu and the northern end of Lake Tanganyika.

7. *Tylopsis ampla* sp. n.

(Text-figs. 8, 30, 45–46)

Diagnosis. ♂ ♀. Lateral pronotal lobes as in Text-fig. 30. Male cerci as in Text-fig. 8, with marked concavity on outer side near apex. Female subgenital plate with lateral lobes, as in Text-figs. 45 and 46.

Description. ♂. Fastigium of vertex compressed, sulcate above, concave in profile, with narrow anterior point.

Pronotum without lateral carinae ; lateral lobes shaped as in Text-fig. 30. Fore coxae with well-developed spine. Fore tibiae with about 6–10 external ventral spurs. Mid tibiae with about 13–15 external ventral spurs. Hind femora unarmed. Hind tibiae with about 35–55 external dorsal spines. Hind wings extending beyond fore wings by between quarter and third length of latter.

Tenth abdominal tergite unmodified or somewhat emarginate medially. Supra-anal plate triangular. Cerci as in Text-fig. 8, with marked concavity on outer side near apex. Subgenital plate with median apical incision.

General coloration brown or green, usually with red-brown spots over most of body and legs and with few dark brown spots on fore wings. Lateral pronotal lobes usually with small blackish posteroventral spot. Tibial spines and spurs with dark tip. Fore wings with blackish spot at base of *C*. Stridulatory region of left fore wing with dark brown markings. Cerci with dark tip.

♀. As male except for fore wings and genitalia. Subgenital plate with lateral lobes, as in Text-figs. 45 and 46.

Measurements.

	Males	Females
Total length	(20) : 44·0–48·7, mean 46·42	(18) : 43·2–50·2, mean 47·04
Median length of pronotum	(20) : 3·6– 4·5, mean 4·03	(19) : 3·7– 4·7, mean 4·06
Length of hind femur	(20) : 25·3–30·0, mean 27·72	(15) : 25·9–30·8, mean 28·19
Length of fore wing	(20) : 30·4–33·9, mean 31·89	(18) : 29·3–35·0, mean 33·09
Length of ovipositor		(19) : 5·7– 7·2, mean 6·30

VARIATION. The pronotum varies a little in shape, sometimes showing a tendency to form an anteroventral angle. There is variation in the number of tibial spines and spurs. The degree of development of the lateral lobes of the female subgenital plate varies somewhat.

DISCUSSION. The male of this species may be easily recognized by the shape of the cerci, and the female by the relatively deep lateral pronotal lobes and the shape of the subgenital plate. *T. ampla* sp. n. is more robustly built than most species of the genus, though sometimes equalled in this respect by *T. continua* (Walker).

MATERIAL EXAMINED.

Holotype. ANGOLA : Moxico distr., upper Mu-Simoj R., ♂, 20–23.ix.1927 (*Burr*).

Paratypes. ANGOLA : Moxico distr., upper Mu-Simoj R., 7 ♂, 7 ♀, 20–23.ix.1927 (*Burr*) ; Moxico distr., upper Mu-Simoj R., 2 ♂, 2 ♀, 24–25.ix.1927 (*Burr*) ; Moxico distr., valley of R. Mu-Simoj, 1 ♂, 1 ♀, 25.x.1927 (*Burr*) ; Moxico distr., upper Mu-Simoj R., 3 ♂, 5 ♀, 27.ix.1927 (*Burr*) ; Moxico distr., upper Mu-Simoj R., 1 ♂, 20–27.ix.1927 (*Burr*) ; Moxico distr., upper Mu-Simoj R., 1 ♂, 1 ♀, 20.ix.1927 (*Burr*) ; Moxico distr., R. Lungue Bungu, 1 ♀, 3.x.1927 (*Burr*) ; Luchase distr., R. Quangu, 5,000 ft., 1 ♂, 14–15.x.1927 (*Burr*) ; Posto de Caungula, Zovo, Mabete, 8° 03′ S., 18° 13′ E., 750 m., banks of R. Cambonde, 2 ♂, 18–20.vii.1962 (*Machado*) (Mus. Dundo) ; Caluango, R. Caquele, 8° 20′ S., 19° 53′ E., 1 ♂, 6.ix.1961 (*Carvalho*) (Mus. Dundo) ; Huambo, 1 ♂, x.1934 (*Pimentel*) ; CONGO REPUBLIC : Katanga, Kolwezi, at light, 1 ♂, 9.x.1953 (*Gilbert*) (Mus. Af. Cent.) ; Katanga, Kafakumba, 1 ♀, ix.1924 (*Overlaet*) (Mus. Af. Cent.) ; Katanga, Kasompi, nr. Jadotville, 1 ♀, x.1956 (*Marlier, Laurent & Neleup*) (Mus. Af. Cent.) ; Elisabethville, 1 ♂, 2 ♀, x–xi.1911 (*Miss. Agric.*) (Mus. Af. Cent.) ; Elisabethville, 1 ♂, 5.xi.1923 (*Seydel*) (Mus. Af. Cent.) ; Elisabethville, 1 ♂, x.1934 (*Seydel*) (Mus. Af. Cent.) ; Lulua, Luashi, 1 ♂, 1936 (*Freyne*) (Mus. Af. Cent.) ; NORTHERN RHODESIA : Congo Border, Shinsenda, 1 ♀, 6.xi.1928 (*Silvester Evans*) ; Chisinga Plateau, Kalungwisi distr., 4,500 ft., 1 ♀, 17.ix.1908 (*Neave*) (Univ. Mus. Oxford).

In the Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. So far known only from Angola, Northern Rhodesia and the southern part of the Congo Republic.

8. ***Tylopsis continua*** (Walker, 1869)

(Text-figs. 9–11, 31, 47–48, 50–52)

Phaneroptera continua Walker, 1869 : 337. Lectotype ♂, SOUTH AFRICA : Durban (Brit. Mus. (Nat. Hist.)) [examined].

Phaneroptera vicaria Walker, 1869 : 338. Holotype ♂, SOUTH AFRICA : Durban (Brit. Mus. (Nat. Hist.)) [examined].

Tylopsis longipennis Stål, 1876 : 58. Holotype ♂, SOUTH WEST AFRICA : Damara (Nat. Riksmus. Stockholm) [examined].

Tylopsis vittata Brunner, 1878 : 229. Lectotype ♂, SOUTH AFRICA : Durban (Nat. Mus. Vienna) [examined].

Tylopsis inhamata Karsch, 1888 : 453. Lectotype ♂, MOZAMBIQUE : Delagoa Bay (Zool. Mus. Berlin) [examined].

Diagnosis. ♂ ♀. Lateral pronotal lobes as in Text-fig. 31. Male cerci as in Text-figs. 9–11, not attenuate at apex. Female subgenital plate as in Text-figs. 47 and 48, triangular. Pronotum usually with dark brown or red-brown dorsal stripe, and with dark brown ventro-lateral spot on lateral lobes.

Measurements.

	Males	Females
Total length	(20) : 33·0–48·4, mean 40·74	(20) : 30·5–46·3, mean 40·01
Median length of pronotum	(20) : 3·1– 4·7, mean 3·83	(20) : 3·2– 4·6, mean 3·86
Length of hind femur	(20) : 18·4–28·9, mean 25·17	(20) : 18·9–30·4, mean 25·70
Length of fore wing	(20) : 22·0–34·8, mean 28·38	(20) : 23·5–31·6, mean 28·20
Length of ovipositor		(20) : 5·2–10·9, mean 7·45

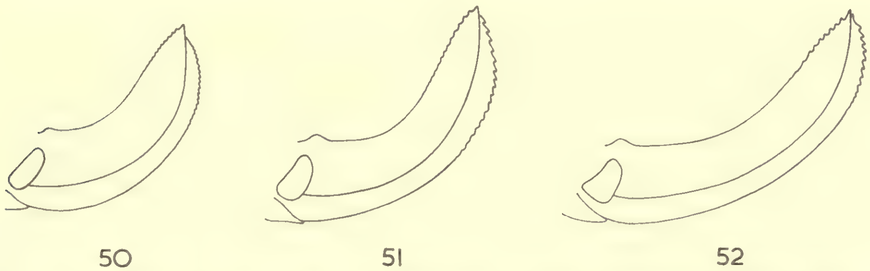
Brachypterous form (see below)

	Males	Females
Total length	(3) : 27·9–31·7, mean 30·33	(2) : 27·3–27·4, mean 27·35
Median length of pronotum	(3) : 3·6– 3·8, mean 3·74	(2) : 3·8– 4·0, mean 3·90
Length of hind femur	(3) : 21·5–23·2, mean 22·13	(1) : 23·8
Length of fore wing	(3) : 19·8–22·0, mean 21·03	(2) : 20·5–21·0, mean 20·75
Length of ovipositor		(2) : 9·5– 9·8, mean 9·65

Discussion. The almost invariable dark brown or red-brown colour of the pronotal disc (occasionally restricted to a narrow median stripe and rarely absent) enables this species to be readily distinguished from all the other species of the genus except *T. rubrescens* Kirby and *T. gracilis* Chopard ; when this dark colouring is not developed the male may be recognized by the shape of the cerci, and the female by the shape of the subgenital plate and the basal plates of the ovipositor. *T. continua* (Walker) may be easily distinguished from *T. gracilis* Chopard by its much larger size, and from *T. rubrescens* Kirby by the male cerci, which are not or hardly bent upwards near the apex, and the basal plates of the ovipositor, which lack a postero-ventral lobe ; the three species also differ in the shape of the lateral pronotal lobes (cf. Text-figs. 31–33).

The ovipositor of this species shows considerable variation in size : it is usually relatively larger than in the other species of *Tylopsis* Fieber and in some of the South African specimens examined it was extremely large (see Text-figs. 50–52). This may be an indication that sibling species are involved, but this question cannot be settled until more material is available.

Three of the Southern Rhodesian males examined, and one male and two females



Figs. 50–52. Lateral view of the ovipositor of *Tylopsis continua* (Walker) from (50) Southern Rhodesia ; (51) Tanganyika ; (52) Zululand.

from the Transvaal, had considerably shorter wings than usual. These specimens appeared to differ in no other respect from typical members of the present species, however, and I am regarding them as representing a brachypterous form of *T. continua* (Walker).

I have selected and labelled a male lectotype from each of the following type-series :—

T. continua (Walker), 4 ♂ and 1 ♀ syntypes
T. vittata Brunner, 4 ♂ and 1 ♀ syntypes
T. inhamata Karsch, 3 ♂ and 3 ♀ syntypes.

MATERIAL EXAMINED.

Lectotype. SOUTH AFRICA : Durban, ♂.

Paralectotypes. SOUTH AFRICA : Durban, 1 ♀ ; ———, 3 ♂.

TANGANYIKA : Old Shinyanga, Boma, 2 ♂, ii–iv ; Dar-es-Salaam, 1 ♀, v ; Old Shinyanga, 1 ♂, v ; NORTHERN RHODESIA : Mporokoso distr., Mweru Wa Ntipa, 5 ♂, 1 ♀, vii ; Kienge, 1 ♀, i (Mus. Af. Cent.) ; Kipundu, 1 ♀, i (Mus. Af. Cent.) ; Abercorn, Kalambo, 1 ♀, iii ; nr. Chilangozi Game Camp, 1 ♀, vi ; Fort Jameson distr., 13° 21′ S., 30° 40′ E., 1 ♀, vii ; Luano Valley, Chisorwe, 5 ♂, 8 ♀, i–iv ; Luano Valley, Kabulu, 1 ♂, iv ; SOUTHERN RHODESIA : Salisbury, Queque, 1 ♂ (S. A. Mus.) ; Mashonaland, Salisbury, 5,000 ft., 1 ♀, iii (Univ. Mus. Oxford) ; M., Umtali, 3,700 ft., 1 ♂ (Inst. Esp. Ent.) ; M., Salisbury, 1 ♂, iii ; Hatfield, Salisbury, 2 ♂, i–iii ; Saw Mills, 1 ♂, ii (Nat. Mus. S. R.) ; Zimbabwe, 1,100 m., 1 ♂, iii (Cal. Acad. Sci.) ; Bulawayo, 1 ♂, iv ; Zimbabwe, 1,100 m., 1 ♂, iii (Cal. Acad. Sci.) ; Bulawayo, 1 ♂, iv ; Matopas Experimental Station, nr. Bulawayo, 1 ♀, ii ; NYASALAND : Fort Johnston, 1 ♀ ; Lujere, Mlanje, 1 ♂, xii (Nat. Mus. S. R.) ; Mt. Mlanje, 2 ♂, xii ; 13 miles S.E. of Fort Hill, 1,300 m., 1 ♂, ii (Cal. Acad. Sci.) ; W. shore of Lake Nyasa, 1 ♂, v ; Zomba, 2,000–3,000 ft., 1 ♂, 1 ♀, ix ; MOZAMBIQUE : Inhaca I., 1 ♀, ix (Transvaal Mus.) ; Gorongoza, Sungoue, 40 m., 1 ♀ (Mus. Hist. Nat. Paris) ; Delagoa Bay, 1 ♂, i (S. A. Mus.) ; Delagoa Bay, 3 ♂, 3 ♀ (*Monteiro*) (Zool. Mus. Berlin) (lectotype and paralectotypes of *T. inhamata* Karsch) ; ANGOLA : Amboim, 1 ♂, iv ; SOUTH WEST AFRICA : Nuragas, 1 ♀, i (S. A. Mus.) ; Damara, 1 ♂ (*De Vylder*) (Nat. Riksmus. Stockholm) (holotype of *T. longipennis* Stål) ; Ovamboland, Odongua, 1 ♂, i (S. A. Mus.) ; SOUTH AFRICA : Transvaal, Masina, 1 ♂, v ; T., Drakensberg Mtns., 12 miles W. of Klaserie, 1,275 m., 1 ♂, iii (Cal. Acad. Sci.) ; T., 15 miles W. of Pongola, 550 m., 1 ♂, iv (Cal. Acad. Sci.) ; T., Gwaliweni, Ingwavuma distr., 1 ♂, 3 ♀, iv (Transvaal Mus.) ; Louwscreek, 1 ♂, iii (Transvaal Mus.) ; Port. St. Johns, 1 ♂, ii (Transvaal Mus.) ; Skukusa, 1 ♂, iii (Transvaal Mus.) ; Bruk. R., 1 ♂, x (Transvaal Mus.) ; Wonderboom, 1 ♂, ii (Transvaal Mus.) ; Mt. Selinda, 1 ♂, iv (Transvaal Mus.) ; Pretoria, 1 ♂, i ♀, ii–iv (Transvaal Mus.) ; Clearwaters, Woodbush, 1 ♂, xii (Transvaal Mus.) ; Rooiplaat, 1 ♂, iii (Transvaal Mus.) ; Hondeklip Bay, 1 ♂, xi (Transvaal Mus.) ; Camperdown, 1 ♂, iv (Transvaal Mus.) ; Groenkloot, 1 ♀, viii (Transvaal Mus.) ; Pretorius Kop, 1 ♂, iii (Transvaal Mus.) ; Minastune, 1 ♂, xii (Transvaal Mus.) ; Natal, Tugela R., 19 miles N. of Kranskop, 450 m., 1 ♂, iv (Cal. Acad. Sci.) ; N., Weenen, 2 ♂, 1 ♀ ; N., Durban, 6 ♂, 3 ♀ (including holotype of *Phaneroptera vicaria* Walker, and lectotype and paralectotypes of *T. vittata* Brunner (Nat. Mus. Vienna)) ; Ladysmith, 1 ♀ (Inst. Esp. Ent.) ; Zululand, Hudley, 1 ♀, xi–xii (Transvaal Mus.) ; Z., Nagana Res. Lab., 2 ♂, 2 ♀ ; Z., Mlumluwe, 2,000 ft., 1 ♀, iv ; Z., 1 ♂ ; Swaziland, 1 ♀ (S. A. Mus.) ; Cape Province, Somerset West, 6 ♂, xii–i (Nat. Mus. S. R.) ; C.P., Kirstenbosch, 1 ♀, xi ; C.P., Vryburg, 1 ♂, i–ii (S. A. Mus.) ; C.P., Murraysburg distr., 1 ♂, 1 ♀, iii (S. A. Mus.).

Brachypterous form (see p. 317). SOUTHERN RHODESIA : Inyanga, 7,000 ft., 2 ♂, ii (Nat. Mus. S. R.) ; Macheke, 1 ♂, ii (Nat. Mus. S. R.) ; SOUTH AFRICA : Transvaal, Mariepskop, 1 ♂, 2 ♀, i (Transvaal Mus.).

In Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. This species is widely distributed in southern Africa, its range extending southwards to the coast of Cape Province. The northernmost records are from Old Shinyanga (Tanganyika) in East Africa and Amboim (Angola) on the western side of the continent.

9. ***Tylopsis rubrescens*** Kirby, 1900

(Text-figs. 12, 32, 49)

Tylopsis rubrescens Kirby, 1900 : 216. Holotype ♂, NYASALAND : Zomba (Brit. Mus. (Nat. Hist.)) [examined].

Tylopsis punctulata Kirby, 1900 : 216. Lectotype ♂, NYASALAND : Zomba (Brit. Mus. (Nat. Hist.)) [examined]. **Syn. n.**

Tylopsis meruensis Sjöstedt, 1909 : 134. Lectotype ♂, TANGANYIKA : Mt. Meru (Nat. Riksmus. Stockholm) [examined]. **Syn. n.**

Tylopsis confluens Karny, 1915 : 124. Holotype ♀, GUINEA : Upper Niger (Nat. Mus. Vienna) [examined]. **Syn. n.**

DIAGNOSIS. ♂ ♀. Lateral pronotal lobes as in Text-fig. 32. Male cerci as in Text-fig. 12, bent upwards near apex. Female subgenital plate as in Text-fig. 49, triangular. Pronotum with dark brown or red-brown dorsal stripe ; lateral lobes without dark brown ventrolateral spot. Basal plates of ovipositor with posteroventral lobe, as in Text-fig. 49.

MEASUREMENTS.

	MALES	FEMALES
Total length	(20) : 37·6–51·5, mean 43·15	(18) : 40·1–47·3, mean 44·31
Median length of pronotum	(20) : 3·3– 4·5, mean 3·80	(20) : 3·6– 4·3, mean 3·94
Length of hind femur	(20) : 22·5–28·8, mean 25·95	(19) : 25·0–30·7, mean 27·27
Length of fore wing	(20) : 26·4–35·6, mean 30·26	(20) : 28·2–36·2, mean 31·65
Length of ovipositor		(19) : 5·2– 6·4, mean 5·69

DISCUSSION. The dark brown or red-brown colour of the pronotal disc enables this species to be easily separated from all the other species of the genus except *T. continua* (Walker) and *T. gracilis* Chopard. It may be readily distinguished from *T. gracilis* Chopard by its much larger size, and from *T. continua* (Walker) by the shape of the male cerci, which are bent upwards near the apex, and the posteroventral lobe on the basal plates of the ovipositor ; the three species also differ in the shape of the lateral pronotal lobes (cf. Text-figs. 31–33).

T. rubrescens Kirby is almost as widespread in Africa as *T. irregularis* Karsch, though both the northern and southern limits of its known range are rather more southerly.

Although agreeing well enough with the present species in most characters of diagnostic importance for me to regard them as conspecific with its holotype, the three specimens forming the type-series of *T. punctulata* Kirby are rather atypical in some respects: the fore wings are unusually broad, for example, and the coloration is rather unusual. Acting as first reviser I have therefore chosen to give priority to the name *T. rubrescens* Kirby, over which *T. punctulata* Kirby has position precedence in the original publication. This course will minimize the nomenclatural adjustments that would be necessary if *T. punctulata* Kirby should be later regarded as a distinct species.

Examination of the type-specimens of *T. meruensis* Sjöstedt and *T. confluens* Karny has shown that they are conspecific with the holotype of *T. rubrescens* Kirby.

I have selected and labelled a male lectotype from the following type-series :—

T. punctulata Kirby, 2 ♂ and 1 ♀ syntypes
T. meruensis Sjöstedt, 1 ♂ and 1 ♀ syntypes.

MATERIAL EXAMINED.

Holotype. NYASALAND : Zomba, ♂ (*Rendall*).

GUINEA : Upper Niger, 1 ♂, 1911 (*Klaptocz*) (Nat. Mus. Vienna) (holotype of *T. confluens* Karny) ; DAHOMEY : Atakora, 600–700 m., 1 ♂, vi (I.F.A.N. Dakar) ; NIGERIA : Niger Province, Minna, 1 ♂, 2 ♀, viii–i ; N.P., Diko, 1 ♀, xii ; CONGO REPUBLIC : Tanganika, M'Pala, 1 ♂, vii (Mus. Af. Cent.) ; 4 miles S. of Sampwe, 980 m., 1 ♂, i (Cal. Acad. Sci.) ; RUANDA : Kagera, Gahinga, 1 ♀, iv (Mus. Af. Cent.) ; URUNDI : Kanyinya, 2 ♀, vii (Mus. Af. Cent.) ; Kanyinya, 1,500 m., 1 ♂, vi–xii (Mus. Af. Cent.) ; UGANDA : Mbarara, 1 ♂, i ; KENYA : Moyale, 1 ♂, xii ; Kikueni R., 1 ♀ ; Wandanyi, 5,000 ft., 1 ♀, iii ; Chyulu Hills, 3,000 ft., 1 ♂, vii ; TANGANYIKA : Mt. Meru, 1 ♂, 1 ♀ (*Sjöstedt*) (Nat. Riksmus. Stockholm) (lectotype and paralectotype of *T. meruensis* Sjöstedt) ; Lulanguru, 1 ♂, xii ; Kilimanjaro, New Moshi, 800 m., 1 ♀, iv (Inst. Esp. Ent.) ; W. shore of Lake Manyara, 1 ♀, ii–v ; Old Shinyanga, Boma, 1 ♀, ii ; Meru, 7,000–8,000 ft., 1 ♂, i ; Milepa Plain, 2 ♂, ii ; Rukwa Valley, 1 ♂, 1 ♀, v ; Morogoro, 1 ♂ ; Tindigo, 1 ♀, vi ; NORTHERN RHODESIA : N. of Lusaka, 1 ♂, vi ; Luano Valley, Chisorwe, 2 ♂, i–ii ; Fort Jameson, 2 ♂ (Nat. Mus. S. R.) ; Abercorn, 1 ♂, i ; E. Loangwa distr., Petauke, 2,400 ft., 1 ♂, xii (Univ. Mus. Oxford) ; SOUTHERN RHODESIA : Mashonaland, Umtali, 3,700 ft., 1 ♀ (Inst. Esp. Ent.) ; M., Salisbury, 1 ♀ (S. A. Mus.) ; NYASALAND : Zomba, 2 ♂, 1 ♀ (*Rendall*) (lectotype and paralectotypes of *T. punctulata* Kirby) ; 19 miles N. of Kasungu, 1,100 m., 1 ♂, ii (Cal. Acad. Sci.) ; MOZAMBIQUE : M'tangula, 1 ♂, vi (Mus. Zool. Lisbon) ; ANGOLA : Huila distr., Ongueria, c. 5,500 ft., 1 ♂, vi ; 24 miles S.E. of Chibia, 1 ♀, v (Cal. Acad. Sci.) ; BECHUANALAND : Ngamiland, 2 ♂, v ; SOUTH AFRICA : Crocodile Bridge, 2 ♂, 1 ♀, iii (Transvaal Mus.).

In Brit. Mus. (Nat. Hist.) unless otherwise stated.

DISTRIBUTION. This species occurs in most of tropical Africa south of the Sahara, extending southwards into Transvaal.

10. ***Tylopsis gracilis*** Chopard, 1954
(Text-figs. 13, 33)

Tylopsis gracilis Chopard, 1954, in Chopard & Kevan, 1954 : 328. Holotype ♂, KENYA : Mandera distr., Damassa (Brit. Mus. (Nat. Hist.)) [examined].

DIAGNOSIS. ♂. Lateral pronotal lobes as in Text-fig. 33. Cerci as in Text-fig. 13. Pronotum with dark brown dorsal stripe. Total length less than 30 mm.

♀ unknown.

MEASUREMENTS.

	MALES	
Total length	(3) :	25·8–27·8, mean 27·00
Median length of pronotum	(3) :	2·4– 2·5, mean 2·42
Length of hind femur	(2) :	18·8–19·4, mean 19·10
Length of fore wing	(3) :	15·5–15·8, mean 15·63

DISCUSSION. This species may be easily recognized by its small size and the shape of the male cerci. The dark brown colour of the pronotal disc is found elsewhere in the genus only in *T. continua* (Walker) and *T. rubrescens* Kirby, both of which are very much larger than the present species.

MATERIAL EXAMINED.

Holotype. KENYA : Mandera distr., Damassa, 3° 09′ N., 41° 20′ E., desert grass and thorn-bush, ♂, 19.xii.1944 (*Kevan*).

SOMALI REPUBLIC : Danot, 2 ♂, 25.xi.1953 (*Popov*).

All in Brit. Mus. (Nat. Hist.).

DISTRIBUTION. Known only from the semi-desert area of East Africa.

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REVISION OF THE FAMILY PNEUMORIDAE (ORTHOPTERA : ACRIDOIDEA)

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NATURAL HISTORY

V. M. DIRSH

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ENTOMOLOGY Vol. 15 No. 10
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Anti-Locust Research Centre, London

Pp 323–396 ; 38 *Text-figures*

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By V. M. DIRSH

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SYNOPSIS

The family Pneumoridae of Acridoidea is revised from the taxonomic point of view. All relevant data concerning morphology, ecology, geographical distribution and phylogenetic interrelation are summarized. Nine genera and eighteen species of the family are recognized.

INTRODUCTION

THE recent discovery of male Pneumoridae (Dirsh, 1963) with a small non-inflated body has made it necessary to alter the diagnosis of the family and to a certain extent the whole conception of it from the taxonomic point of view. This has consequently led to revision of the genera and species.

This task was extremely difficult owing to the great rarity of some of the species, general lack of material and in several cases the uncertainty of conspecificity of the males and females. Some of them are placed in the same species only tentatively. A favourable factor, however, was that practically all the types of described species of the family still exist and are preserved in reasonably good condition. They have all been studied, and compared with each other and with other available material, thus allowing the establishment in several cases of correct synonymy.

This revision does not ensure that all taxonomic problems in Pneumorids are solved. Many remain unsolved, mostly because of lack of material and almost complete absence of field observations. Several species are still known by one sex only.

There is reason to believe that the family is steadily diminishing in size of populations, as Thunberg in 1772 definitely found them in abundance (Thunberg, 1795), whereas at the present time, and in the same localities, only a few specimens can be found.

It is my pleasant duty to express my sincere gratitude to Mr. H. Dick Brown, Dr. G. van Son and Dr. T. H. C. Taylor for reading the manuscript and for their opinions and suggestions towards improving it. I am also grateful to Mr. J. P. Doncaster, Keeper of the Department of Entomology, British Museum (Natural History) for his favourable attitude towards the publication of this work.

MATERIAL USED

Besides the types, the material used for this work was lent from the following museums and by the courtesy of the following persons. I wish to express my sincere gratitude to all the following museums and to the persons concerned with providing the material used in this study, without which this revision would have been impossible. Dr. M. Beier, Naturhistorisches Museum, Vienna ; Mr. H. Dick Brown, Pretoria ; Mr. R. H. Carcasson, Coryndon Museum, Nairobi ; Dr. L. Chopard, Muséum National d'Histoire Naturelle, Paris ; Dr. Kurt Günther, Zoologisches Museum der Universität, Berlin ; Dr. B. Hanson, Naturhistoriska Riksmuseet, Stockholm ; Dr. L. Hedström, Zoological Institute, University, Uppsala ; Dr. A. J. Hesse, South African Museum, Cape Town ; Mr. W. J. Lawson, Durban Museum, Durban ; Dr. E. Morales-Agacino, Instituto Espanol de Entomologia, Madrid ; Dr. E. Pinhey, National Museum of Southern Rhodesia, Bulawayo ; Dr. D. R. Ragge, British Museum (Natural History) ; Mr. C. J. Schiff, Albany Museum, Grahamstown ; and Dr. G. van Son, Transvaal Museum, Pretoria.

TYPES STUDIED

LINNAEUS' TYPES

Two species of Pneumoridae were described by Linnaeus in the tenth edition of the " Systema Naturae ". They are :

1. *Gryllus Bulla unicolor* Linnaeus, 1758.
2. *Gryllus Bulla variolosus* Linnaeus, 1758.

Both species are denoted in the descriptions " M.L.U." (Museum Ludovicae Ulricae), and " Habitat in Indiis ". The locality is erroneous, as Pneumoridae occur only in Africa. From the descriptions it is apparent that Linnaeus had at least two or several specimens of each species.

At present in the Lovisa Ulrika Collection in Uppsala there are several specimens of Pneumorids which should be regarded as Linnaean specimens. They are all in a rather poor state of preservation but mostly recognizable. They bear no original Linnaean labels but labels in Thunberg's handwriting are pinned in the box below them ; also they have on the pins more recent labels, possibly of Aurivillius, designating them as the types. However, Aurivillius never published his type designations, so these labels have no formal significance.

1. *Gryllus Bulla unicolor*. Three conspecific specimens present.
   - (a) A male with the wings spread and of a greenish-yellow colour, labelled by Thunberg as "*unicolor* Lin. *immaculata* β". This specimen is here selected as *LECTOTYPE* of *Gryllus Bulla unicolor* Linnaeus, 1758.
   - (b) A male labelled by Thunberg as "*immaculata* α". Possibly not a Linnaean specimen.
   - (c) A male with both pairs of wings spread and of a reddish coloration, labelled by Thunberg as "*rubrus immaculata ruf.* (*unicolor* Lin.)". Probably a Linnaean specimen, since he also mentioned this coloration in his description.
2. *Gryllus Bulla variolosus*. Three specimens present.
   - (a) A male with the wings spread, labelled by Thunberg as "*variolosus* Lin.". This specimen is here selected as *LECTOTYPE* of *Gryllus Bulla variolosus* Linnaeus, 1758.
   - (b) An adult female conspecific with (a), labelled by Thunberg as "*variolosus* Lin. Larva." possibly not a syntype.
   - (c) An adult female in poor condition, labelled by Thunberg as "*immaculata* Larva.". Not now identifiable, but certainly not a female of *immaculata*. Probably not a syntype.

THUNBERG'S TYPES

All Thunberg's types of Pneumoridae are still in existence and are preserved in the Uppsala Museum in "Thunberg's Collection". All are in reasonably good condition. There are no labels attached to the insects, but there are labels in Thunberg's handwriting pinned on the bottom of the box. Since the specimens correspond very well with Thunberg's descriptions and particularly with the figures published by him (Text-fig.1) it is reasonably safe to assume that these specimens are accepted as being the types and syntypes on which Thunberg based his descriptions.

1. *Pneumora immaculata* Thunberg, 1775. Three syntype male specimens present, "α, β, γ" which correspond quite well with the specimens with the same letters in Thunberg's description. The specimen mentioned by Thunberg under the letter "δ" is missing. All three specimens are conspecific. The specimen marked "β" is here selected as *LECTOTYPE*.

Pneumora immaculata was compared with the lectotype of *Gryllus Bulla unicolor* Linnaeus, 1758 and with a series of recent material of this species and was found conspecific.

2. *Pneumora rubens* Thunberg, 1810. Two male syntypes of *P. rubens* present, " α " and " β ". They are conspecific with one another, and also with *Pneumora immaculata* Thunberg, and therefore with *Gryllus Bulla unicolor* Linnaeus, 1758. They differ from other specimens of the species by a general reddish coloration. Between themselves they differ in body size, the " α " specimen being larger. In the description of *Pneumora rubens* Thunberg, 1810, the " α " and " β " specimens are not mentioned. Here the " α " specimen is selected as the *LECTOTYPE* of *Pneumora rubens* Thunberg, 1810.

3. *Pneumora papillosa* Thunberg, 1810. Under this name there is one male specimen in Thunberg's Collection. According to the description and figure, there is no doubt that it is the type. It is conspecific with the female of *Pneumora obliqua* Thunberg, 1810, the latter name having priority. It is distinguishable from the other species by the presence of two oblique, white stripes on the side of the pronotum.

Kirby (1910) renamed this species as *Bulla thunbergii*, as the specific name *papillosa* was preoccupied by Fabricius, 1775.

4. *Pneumora discolor* Thunberg, 1810. One male in Thunberg's Collection present which, according to the description and figure, is undoubtedly the type. It differs from the other specimens of the species by a slightly brownish coloration of the basal two thirds of the elytra and wings. This is a rather infrequent individual variation which occurs in this and other species of the genus.

5. *Pneumora ocellata* Thunberg, 1810. Under this name in Thunberg's Collection there is one male specimen. From the description and the figure it is clear that the specimen is the type. It is conspecific with *Pneumora discolor* Thunberg, 1810. The only difference is that the elytra and wings are of uniformly greenish colour. This is the most common type of coloration for the species.

6. *Pneumora pupillata* Thunberg, 1810. Under this name in Thunberg's Collection there is one male specimen. From the description and the figure there is no doubt that the specimen is the type. It is conspecific with *Pneumora discolor* Thunberg, 1810 and *Pneumora ocellata* Thunberg, 1810. The only difference is that the elytra of *P. pupillata* are sparsely covered with brownish dots. This is an individual variation which sometimes occurs in this and other species.

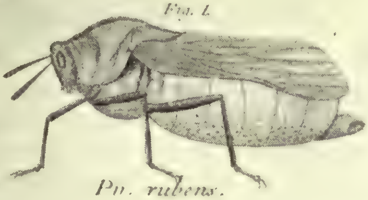
7. *Pneumora serrata* Thunberg, 1810. Under this name in Thunberg's Collection there is one female specimen. According to the description and the figure there is no doubt that it is the type.

8. *Pneumora obliqua* Thunberg, 1810. In Thunberg's Collection one female specimen is present. It corresponds very well with the description and the figure and doubtless is the type.

FIG. 1. Plate of Pneumorids originally published by Thunberg in 1810. The types of Thunberg's Collection correspond very well with the drawings.

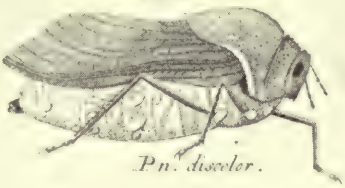
Tab. II.

Fig. 1.



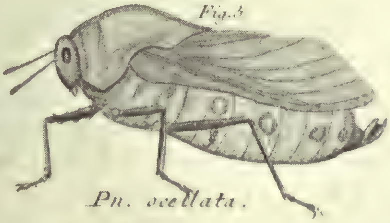
Pn. rubens.

Fig. 2.



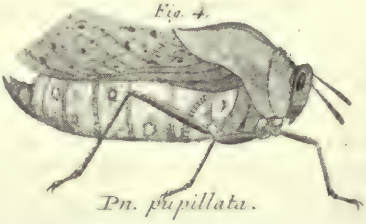
Pn. discolor.

Fig. 3.



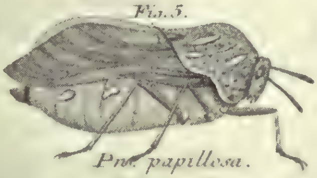
Pn. ocellata.

Fig. 4.



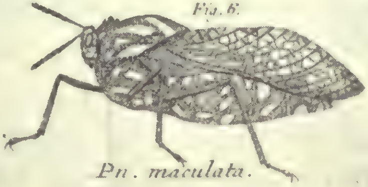
Pn. pupillata.

Fig. 5.



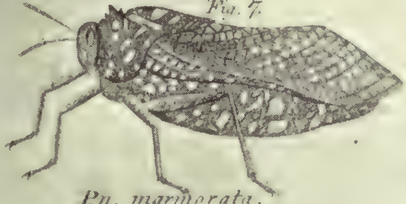
Pn. papillosa.

Fig. 6.



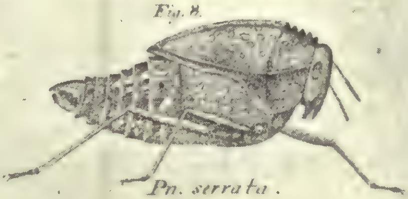
Pn. maculata.

Fig. 7.



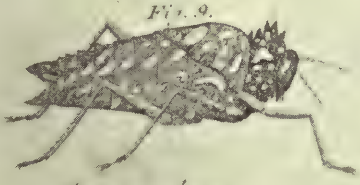
Pn. marmorata.

Fig. 8.



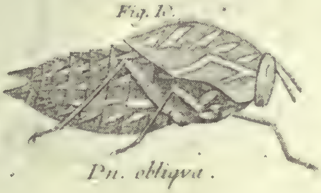
Pn. serrata.

Fig. 9.



Pn. spinulosa.

Fig. 10.



Pn. obliqua.

9. *Pneumora maculata* Thunberg, 1775. In Thunberg's Collection one male specimen is present. It corresponds with the description and doubtless is the type. It is conspecific with *Gryllus Bulla variolosus* Linnaeus, 1758. It differs slightly in the pattern, but the difference does not exceed the range of individual variability.

10. *Pneumora marmorata* Thunberg, 1810. In Thunberg's Collection two male syntypes " α " and " β " present. They belong to the same species. However, in the original description they are not mentioned under the different letters. Here the male marked " β " is designated as the *LECTOTYPE* of *Pneumora marmorata* Thunberg, 1810. It corresponds very well with the original description and figure and could be safely considered as Thunberg's original specimen. It is conspecific with *Gryllus Bulla variolosus* Linnaeus, 1758 and differs slightly from it only in the pattern on the pronotum.

11. *Pneumora spinulosa* Thunberg, 1810. Under this name in Thunberg's Collection there is one female specimen. It corresponds with the description and the figure and is undoubtedly the type. It is conspecific with *Gryllus Bulla variolosus* Linnaeus, 1758.

12. *Pneumora sexguttata* Thunberg, 1775. Under this name there is in Thunberg's Collection one male specimen, which according to the description is without doubt the type. Comparison with the Fabricius type of *Gryllus inanis* Fabricius, 1775, proved that they are conspecific. The Fabrician name has priority.

Fabricius' types

1. *Gryllus inanis* Fabricius, 1775. In the Banks Collection in the British Museum (Natural History) there is one male specimen under this name. It is undoubtedly the type. Type Locality : Cape of Good Hope.

2. *Gryllus papillosus* Fabricius, 1775. Under this name in the Banks Collection in the British Museum (Natural History) there is one male specimen. It is certainly the type of the species.

Stoll's types

Stoll mentioned as new and figured three species of Pneumoridae :

1. *Mantis paradoxa* Stoll, 1813, Male.
2. *Gryllus Locusta pulicarius* Stoll, 1813. Male.
3. *Gryllus Locusta vinaceus* Stoll, 1813. Male.

The types of all three species are lost, but the figures and descriptions, although highly inadequate, still indicate that all of them are Pneumoridae and probably belong to the genus *Bullacris*. They have all been synonymized with *Pneumora immaculata* Thunberg, 1775 by Serville, 1888 and Kirby, 1910 (see synonymy of *Bullacris unicolor* Linnaeus, 1758). There is no reason now to consider them otherwise.

They are the only types of Pneumoridae which are lost.

Latreille's type

Pneumora scutellaire Latreille, 1830. Under this name in the Muséum d'Histoire Naturelle in Paris there is one female specimen which most probably is the specimen first described by Latreille in 1830, and again in 1831 by Serville under the same name *Pneumora scutellaris*. It is conspecific with the male of *Gryllus inanis* Fabricius, 1775.

Walker's type

Pneumora membracioides Walker, 1870. Male nymph.

The type is preserved in the British Museum (Natural History). It is a male nymph, probably of the last instar. After studying all available material it was concluded that *P. membracioides* Walker is a nymph of *Bulla longicornis* Stål, 1873.

The same opinion was expressed by Péringuey, 1916.

Stål's types

Stål's types are preserved in good condition in the Stockholm Museum.

1. *Bulla longicornis* Stål, 1873. Male type. The specimen was pinned after being preserved in spirit. All morphological characters are intact, but the integument is discoloured and partly wrinkled. Locality label " Caffraria ". It is conspecific with *Pneumora membracioides* Walker, 1870.

2. *Pneumora granulata* Stål, 1873. Male. This type is in a very good state of preservation. Locality label: " Caffraria ". The female was described as *Bulla subulata* Péringuey, 1916.

Westwood's type

Westwood's type is preserved in the Oxford University Museum.

Physophorina livingstoni Westwood, 1874. Nymph, probably of the last instar. When nymph material was studied, it became clear that *Physophorina livingstoni* is a synonym of *Cystocoelia absidata* Karsch, 1896.

Karsch's type

The male type of *Cystocoelia absidata* Karsch, 1896, is preserved in the Berlin Museum in reasonably good condition. Comparison with the type of *Physophorina livingstoni* Westwood, 1874 and all available material shows that they are conspecific.

Péringuey's types

All Péringuey's types are preserved in the South African Museum, Cape Town. All of them are in a good state of preservation.

1. *Bulla consobrina* Péringuey, 1916. Male and female are conspecific, both with the label " Type ". The male is here selected as the *LECTOTYPE*. Type locality : " Port Elizabeth ". After comparing the types and available recent material, it was found that *Bulla consobrina* Péringuey is conspecific with *Pneumora discolor* Thunberg, 1810.

2. *Bulla intermedia* Péringuey, 1916.
This species was originally described from three males. The type was not designated. At present, in the South African Museum only one male remains labelled " Type ". I select this specimen as the *LECTOTYPE*.

3. *Bulla subalata* Péringuey, 1916. Female type. It has been synonymized rightly by Uvarov, 1928 with *Pneumora granulata* Stål, 1873, which was described from one male only.

4. *Shortridgea miranda* Péringuey, 1916. Male specimen with the label " Holotype " and a conspecific female specimen with the label " Type " present. Here the male specimen is selected as the *LECTOTYPE*. Type locality : " Zululand, Eshowe ".

5. *Cystocoelia boschimana* Péringuey, 1961. There is only the female holotype of this species, in a good state of preservation, the male is unknown. Type locality : " Bushmanland, Henkries ".

6. *Pneumora namaqua* Péringuey, 1916. Male specimen with the labels : "Springbok Fontein. 1873", and "Type", and a female specimen with the labels: " Springbok. 90 " and " Type " present. The male is selected as *LECTOTYPE*. The female belongs to *Pneumoracris browni* Dirsh, 1963, described below.

Rehn's types

Rehn's two types are preserved in the Transvaal Museum, Pretoria.

1. *Bullacris thalassina* Rehn, 1941. Male.
2. *Bullacris namaquensis* Rehn, 1941. Male.

These two species are conspecific inter se and are also conspecific with *Bullacris unicolor* Linnaeus, 1758. They were compared with the Linnaean type and all Thunberg's types, as well as with the series of recent material of the species. The differences recorded by Rehn do not exceed the range of the individual variation.

MORPHOLOGICAL CHARACTERS OF THE FAMILY

Body

The body length of adult Pneumorids varies in males from 11.5 mm.—68 mm. and in females from 22 mm.—107 mm. The smallest is *Pneumoracris browni* and the largest *Physophorina livingstoni*.

In the majority of genera and species the male abdomen is strongly inflated and bladder-like, creating an impression of a huge bulk of roughly cylindrical shape. In males with a non-inflated abdomen, the body is slightly compressed. In females, in the majority of species, the body is compressed or in a few cases, e.g. *Pneumora,* it approximates to cylindrical.

Head

The head of Pneumorids is hypognathous. It is remarkable for the absence of the frontal ridge, which is present to a certain degree in all other families of Acridoidea. The face is flattened and/or slightly convex. A faint fastigial furrow is present. The compound eyes in all species are oval, comparatively small and strongly convex. The ocelli in males are very large, relatively much larger than in all other Acridoidea, in females however, the ocelli are very small (except in one species), mostly vestigial, sometimes hardly detectable. The position of the lateral ocelli may be used as a character for grouping genera, they are placed above and slightly internally to the antennal bases in *Bullacris* and related genera (Text-fig. 8), and they are above and slightly externally to the antennal bases (Text-fig. 29) in *Pneumora* and *Physophorina,* while in *Prostalia* their position is intermediate.

The maxillary palpi are five-segmented and the labial palpi four-segmented, if the palpiger is included in both cases.

The mandibles are of forbivorous type (Isely, 1944) with sharp, large, acute teeth in the incisor parts and with rather sharp, toothed edges in the molar parts (Text-fig. 8).

Antenna

The antennae are relatively short in all genera and species, shorter or much shorter than the pronotum, the scape and pedicel are short, the flagellum filiform or in a few cases slightly club-like. The number of segments varies from 18 to 23 ; in most cases there is the same number in both sexes of a species, but sometimes in females there are one or two segments less than in males. This number fits very well into the range of antennal segments of Acridoidea generally (Mason, 1954). The segments are well defined and rather sharply separated.

Thorax

The pronotum in Pneumorids varies between highly crest-shaped and low tectiform. It is crossed by four, usually well developed transverse sulci. In the first instar, the pronotum is relatively larger, covering the whole body from above. In subsequent instars it becomes relatively smaller, but is still very large even in the adults.

The sternal part of the thorax in general outline is similar to that on all other Acridoidea, but a detailed morpho-anatomical study is necessary to ascertain the homology of the parts. The prosternum is without a process or tubercle. The meso- and metasternum have deep furcal sutures and very deep foveolae (sternal apophyseal pits). The mesosternal lobes (sternellum of anatomists) are relatively small. In males with an inflated abdomen the whole thorax is inflated as well.

ABDOMEN

The segmentation of the abdomen in Pneumorids is of the usual Acridoidea type. In the males of the majority of genera, however, the first five or six abdominal segments form a bladder-like inflation. The first, second and third abdominal segments in the inflated species are partly fused and sometimes it is difficult to distinguish them. The third abdominal tergite bears a crescent-like row of small strongly sclerotized ridges, which represent part of the stridulatory mechanism. The non-inflated distal segments of the abdomen are of usual narrow cylindrical shape. The inflation of the male body apparently appears only at the last moult ; the male nymphs of the last instar have the normal, compressed body.

The terminal abdominal segments are represented by a pair of paraprocts and by a supra-anal plate (epiproct of anatomists), which are regarded as the eleventh abdominal tergite. The paraprocts in Pneumorids are large and frequently exceed the length of the supra-anal plate. The supra-anal plate in both sexes of all genera and species of the family is simple, elongate and angular. The cerci in both sexes also simple, short and conical. The subgenital plate, which in the male is regarded as the ninth abdominal sternite, is short or moderately elongated, conical or acutely conical. In the female the subgenital plate is regarded as the eighth abdominal sternite ; it is always simple with a widely obtuse-angular apex.

The ovipositor in all genera and species is a rather simple, uniform structure, with straight valves, which are subacute and slightly curved at the apices, without external sculpture (Text-fig. 8).

LEGS

The structure of the legs of Pneumorids does not deviate markedly from other Acridoidea. The front and middle pair have no unusual specialization, except that the femora are sometimes tuberculate. The hind legs, however, differ in the respect that functionally they have lost or are losing saltatorial ability and approximate to cursorial. Morphologically they are short and rather slender. They are adapted for walking and also for producing sounds as a part of the sound-producing mechanism. The shape of the hind femur suggests that the lower basal lobe is longer than the upper one. In the middle of the internal side of the male femur there is a short, strongly sclerotized longitudinal carina with a series of strong, short, transverse ridges (Text-fig. 8) for stridulatory purposes (see description of the stridulatory mechanism).

Brunner's organ in most cases is absent, but sometimes it can be traced as a vestigial formation, and in other cases as in *Pneumora* and *Parabullacris*, it is fairly well developed.

The reduction and disappearance of Brunner's organ is probably connected with the lack of saltatorial specialization of the legs. It is observed that in the whole family Proscopiidae it is absent, and the hind legs in that family are also weak and approximating to cursorial. The same is also applicable to the genus *Psednura* of the family Pyrgomorphidae ; the hind legs in this genus are very thin and look almost cursorial. Brunner's organ in this genus also is vestigial. Thus, probably the Pneumorids are losing Brunner's organ as the result of the reduced saltatorial ability.

WINGS

All known Pneumorids possess wings. The males with inflated bodies are all macropterous. The males with non-inflated bodies have vestigial elytra and wings completely hidden under the pronotum.

Females have micropterous elytra and wings completely or partly hidden under the pronotum (*Bullacris, Physemacris*), or strongly shortened brachypterous elytra and wings (*Physophorina, Prostalia* and *Pneumora*). In the genera *Parabullacris* and *Pneumoracris* the elytra and wings in the females are vestigial and completely hidden under the pronotum.

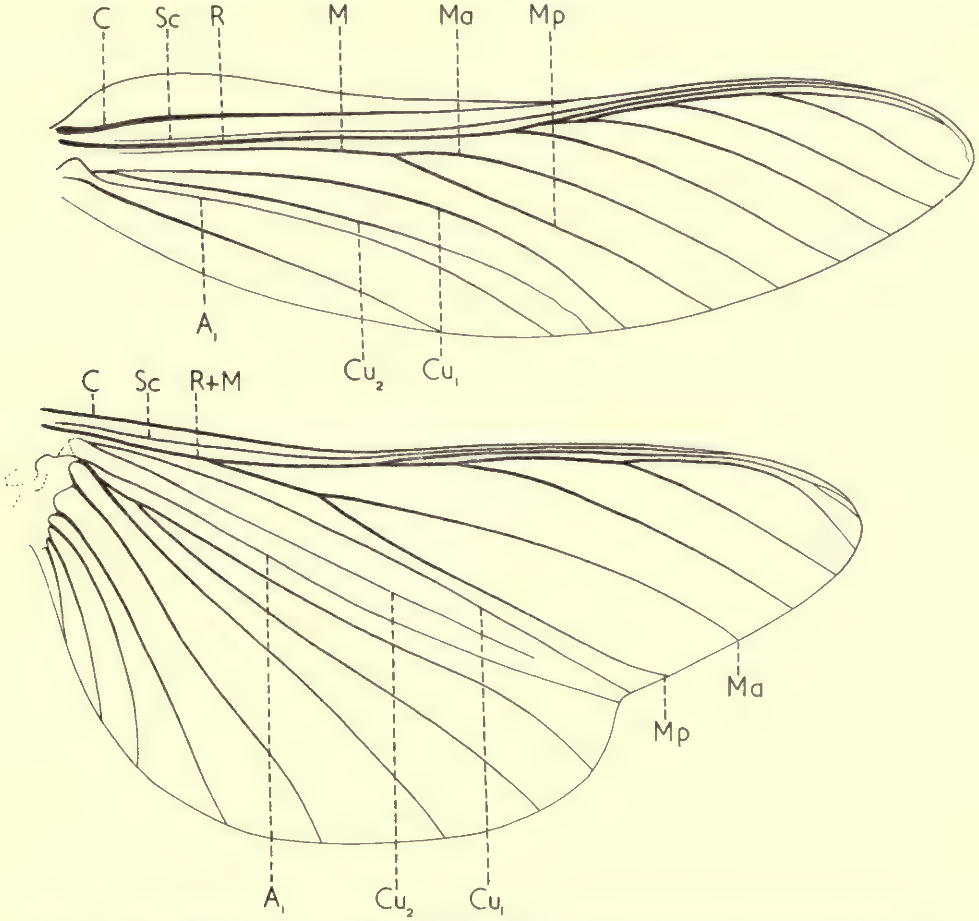


FIG. 2. Wings of the male *Bullacris unicolor*. For lettering of venation see text.

The elytra and wings in the Pneumorids have certain peculiarities which separate them from all other Acridoidea.

The elytra of the macropterous males are comparatively wide : they possess a large remigium (terminology after Snodgrass, 1935) and very small vannus ; there is no vannal flex (vannal fold, Snodgrass, 1935) of the elytra.

The main venation of the elytron (Text-figs. 2–5) is described below. (The terminology used is a combination of that of Snodgrass, 1935, which is the most adequate for Acridoidea and that of Ragge, 1955, who attempted to homologize the venation of all Orthopteroids.)

Costa (*C*) (Snodgrass, 1935 ; Ragge, 1955) : the first main vein, well defined from the basal articulation of the elytron. It is located posteriorly to the anterior or costal margin and reaches about half the length of the elytron.

Subcosta (*Sc*) (Snodgrass, 1935 ; Ragge, 1955) : the second main vein after the costa. It is very well defined from the basal articulation. It runs almost to the apex of the elytron and is unbranched.

Radius (*R*) (Snodgrass, 1935 ; Ragge, 1955) : the third main vein, which is very well defined from the basal articulation, runs next to the subcosta, and forms a branch, the Radial sector (*Rs*), which itself forms three or four branches.

Media (*M*) (Snodgrass, 1935 ; Ragge, 1955), the fourth main vein, is derived from the basal articulation. It is two or sometimes three branched in the apical half.

Cubitus (*Cu*) (Snodgrass, 1935 ; Ragge, 1955): the fifth main vein emerges from the basal articulation and near the base is branched into cubitus (Snodgrass, 1935) or cubitus one Cu_1 (Ragge, 1955) and to postcubitus (Snodgrass, 1935) or cubitus two Cu_2 (Ragge, 1955). The cubitus one is unbranched in the genera *Bullacris*, *Physemacris*, *Peringueyacris* and *Prostalia* (Text-fig. 2) and two branched in the apical half in *Physophorina* and *Pneumora* (Text-fig. 4).

Next to the fifth vein is the dividing vein, vena dividens (Snodgrass, 1935) or the first anal vein *A* (Ragge, 1955). Along this vein the elytron is flexed in all Acridoidea except Pneumoridae. The next vein after the vena dividens is the first vannal vein (Snodgrass, 1935) or the second anal vein (Ragge, 1955).

The wing in the macropterous males is remarkable for its large remigium, of almost the same size as the vannus. The vannal flex (vannal fold, Snodgrass, 1935) is present and the venation is not different from other Acridoidea (Text-figs. 2, 4). The Costa forms the margin of the wing, and the Subcosta almost reaches the apex. The Radius and Media are fused in the basal part ; in the apical half they are both branched, the Radius into Radial sectors and the Media into Media anterior and Media posterior. Cubitus one and Cubitus two are unbranched. The vena dividens (Snodgrass, 1935) or first anal vein (Ragge, 1955) is well pronounced and the wing is flexed along it ; all veins posterior to it are vannal veins (Snodgrass, 1935) or anal veins (Ragge, 1955).

In the brachypterous females (*Physophorina*, *Pneumora* and *Prostalia*) the venation of elytron and wing is essentially the same as in the males of this group (Text-fig. 5), but the first cubital vein of all female elytra is unbranched. All the veins, however, are less developed than in the males and show definite signs of reduction.

In the micropterous females (*Bullacris, Physemacris*) the elytron is thickened and strongly sclerotized and in a few, greatly reduced, but the main veins can be traced (costa, subcosta, radius-media and probably the first anal vein) (Text-fig. 3). The wing in these females is completely hidden under the pronotum. It is much larger

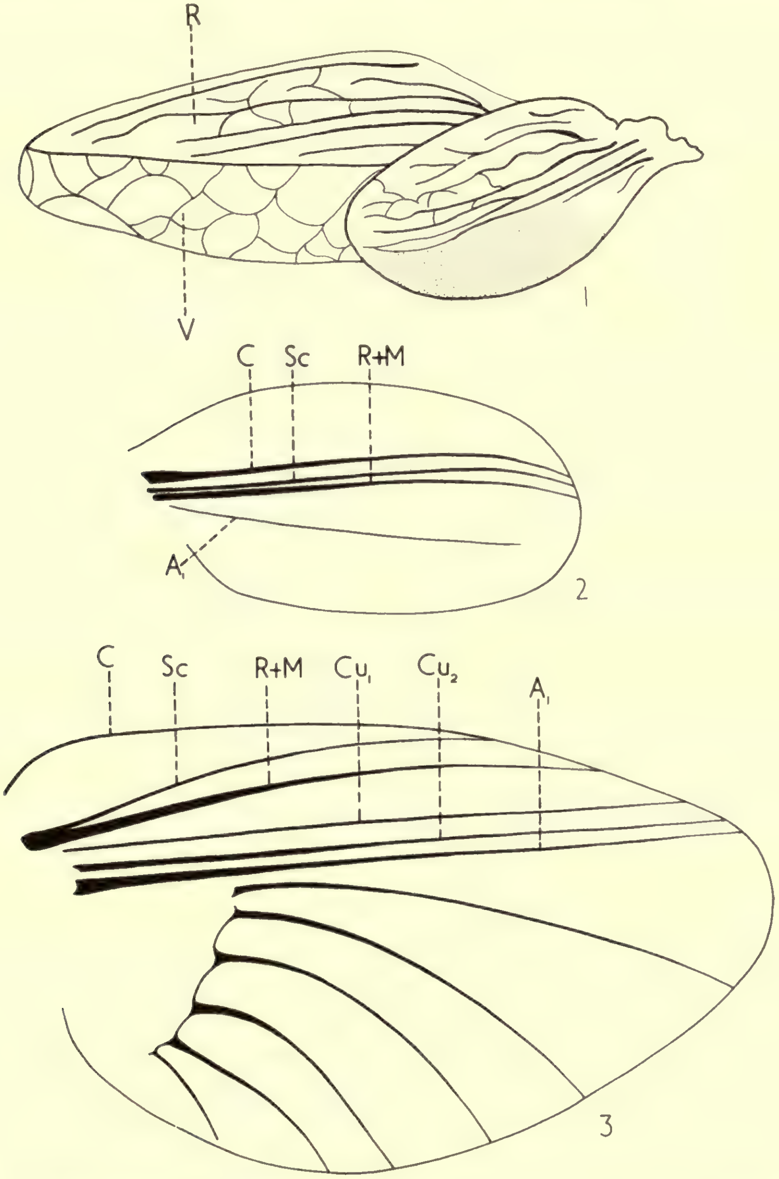


FIG. 3. *Bullacris unicolor*, female. 1, right elytron and wing in normal position ; hind wing folded, R, remigium ; V, vannus. 2, venation of the right elytron. 3, venation of the right wing (for lettering see text).

than the elytron, and its venation is quite detectable (Text-fig. 3), consisting of all the veins as in the males, but reduced and unbranched (Text-fig. 3). The wing is folded singly only (Text-fig. 3) along the vannal flex. Its reticulation is rather strong and is possibly part of the sound producing mechanism (q.v.)

The net-like reticulation of elytra and wings (archedictyon of some authors) exists in both sexes, but is obscure in the sclerotized elytra of micropterous females. It is well pronounced, however, in the micropterous type of wings.

The main differences between the elytra and wings of Pneumoridae and those of the rest of the Acridoidea are, in macropterous species, as follows :

Pneumoridae	Acridoidea
Elytron :	Elytron :
Relatively very wide.	Relatively narrow (except Trigonopterygidae).
Vannal flex absent.	Vannal flex present.
Main veins, in apical half, curved towards posterior margin.	Main veins comparatively straight and very little or not at all curved towards posterior margin.
Remigium relatively large.	Remigium relatively much smaller.
Vannus very small and narrow.	Vannus relatively larger and much wider.
Radial vein and radial sector in basal two thirds fused.	Radial vein and radial sector close together in basal half, but not fused (except in Trigonopterygidae).
Intercalary veins absent.	Intercalary veins mostly present.
Wing :	Wing :
Remigium relatively very large, almost as large as vannus.	Remigium relatively small, much smaller than vannus.
Vannus relatively very small.	Vannus large.
Archedictyon well developed	Archedictyon poorly developed.

Ragge (1963) investigated venation and tracheation of the nymph's wing pads. He showed one more character which distinguishes wings of Pneumorids from those of other Acridoidea. The bases of the tracheae of the elytron and wing, which are branched from the transverse basal trachea, are further apart in Pneumorids than in the rest of the Acridoidea. In the latter, they are more clustered together, particularly those which correspond to the median, cubital and vannal veins (Ragge, 1963). The remoteness of the bases of the tracheae from each other is generally more pronounced in Tettigonioidea, Grylloidea and Gryllacridoidea than in Acridoidea.

It can be definitely asserted that the venation of Pneumorids is the simplest in all the Acridoidea.

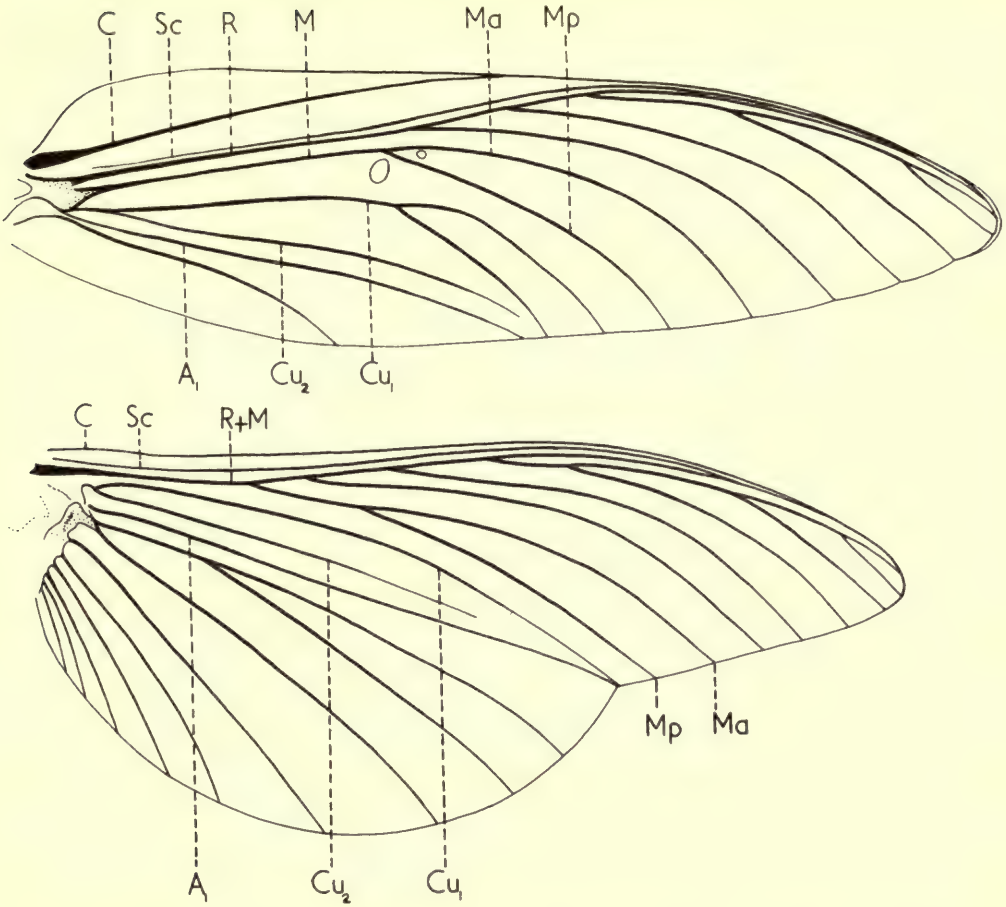


FIG. 4. Elytron and wing of the male *Physophorina livingstoni*. For lettering of venation see text.

STRIDULATORY MECHANISM

The male stridulatory mechanism consists mainly of strongly sclerotized ridges on the third abdominal tergite (Text-figs. 8, 12, 14, 16, 18, 20, 22, 24, 25, 27, 29, 31, 33). The ridges form a crescent-like row, and are smaller at the ends, becoming gradually larger in the median part. At the upper end of the row there is a small, tubercle-like inflation of the body wall of unknown function. The lower part of the row gradually diminishes to the point of obliteration. In *Physophorina* and *Pneumora* the row is represented in the upper half by large, rough ridges and in the lower half, with a small gap between them, by small, slender and more densely placed ridges (Text-figs. 29, 33). The number of ridges may be used as an additional taxonomic character, sometimes of specific value.

The second part of the stridulatory mechanism is a short high carina, bearing a small row of strong, transverse ridges on the internal side of the hind femur (Text-fig. 8). The sound is produced by rubbing the ridges of the abdomen with the ridges of the hind femur. It is assumed that the inflation of the male abdomen represents a further specialization for sound production, its function being a resonator amplifying the sounds. It is true that the inflation increases the sound greatly, but whether this inflation is a primary specialization for sound production or developed for different purposes and became a secondary adaptation for the sound, remains a matter for speculation.

The structure of the inflated abdomen, however, may suggest that it was primarily a sound producing specialization. The abdominal segments, particularly the tergites, are strongly enlarged in width and partly in length, and the connecting intersegmental membrane almost disappears, acquiring almost the same texture as the segments themselves. The integument of the whole inflated part is very thin and semi-transparent ; the tracheae can be seen through it very clearly. All the inflated part, although thin, is sufficiently firm to maintain a definite form of this part of the body. Inside this empty " bladder " only a thin length of the alimentary canal can be seen through the semi-transparent walls. It is difficult to imagine any function of this inflation other than as a resonator.

It seems that the males with a non-inflated body cannot produce sounds unless they possess some kind of mechanism not yet discovered. It should be noted, however, that in the species with the non-inflated body, the same kind of stridulatory mechanism is present as in those with the inflated body, but in a highly reduced, vestigial form and most probably not functional.

The sounds produced by Pneumorids was first mentioned by Thunberg, 1795 in his narrative of the " journey into Caffraria, 1772 ". He described it as follows : " After sunset they begin to make a singular noise, by rubbing their barbed hind legs against their empty and transparent stomach ".

Péringuey, 1916 described the sound produced by the males as . . . " A long and very deep and loud rasping noise, a stop, and a second noise shorter, but occasionally longer than the first, and something as if it were produced by exhalation."

Van Son (in litt. 1963) described the sounds produced by the males of *Bullacris* and *Prostalia* as follows : " it consists of a ' preliminary ' short series of clicks or chirps, followed by a protracted ' main ' sound ". He also stated that in *Pneumora inanis* " there is a long preliminary screech, followed by a series of very human-like ' khonia – khonia – khonia '," that the " *Physemacris variolosa* call has no preliminary sound, and is like the word ' hatchigeeee ' emitted in a rather high screeching note ", and that " in *Physophorina miranda* the call starts with a prolonged screech (not unlike that of *Pneumora*) followed directly by the four sharp metallic " pings ", the first accentuated, the other three in quick succession, thus like the Morse telegraph code letter — · · · ".

It should be noted that the male of both *Physophorina miranda* and *Pneumora inanis* males possess similarly shaped rows of abdominal ridges.

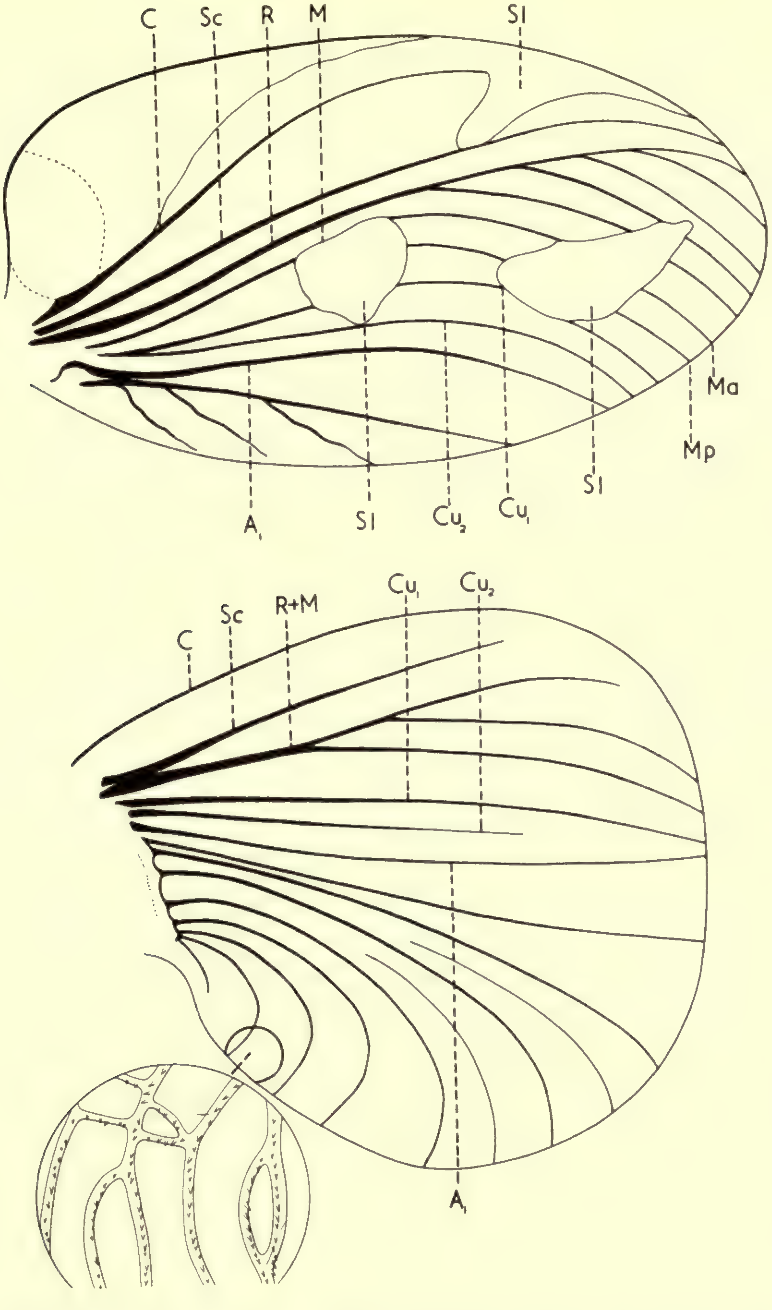

C
Sc
R
M
Sl
Ma
Mp
Sl
A₁
Sl
Cu₂
Cu₁
Cu₁
Cu₂
R+M
Sc
C
A₁

FIG. 5. *Pneumora inanis*. Female. Right elytron and wing. For lettering of venation see text. Below, left, highly magnified part of the wing, showing supposed stridulatory mechanism (diameter of the circle = 1 mm.).

The females do not possess the same kind of sound producing mechanism as the males, but according to many direct observations can produce sounds. Van Son, 1958 described these sounds for *Bullacris longicornis* as follows : " . . . peculiar squeak, somewhat like that produced by a disturbed Death-Head Moth ". . . . When taken in the hand it produced louder squeaks . . . " rather resembling the hiss-like sounds emitted by an angry scorpion ".

Péringuey, 1916 described the sounds produced by the females of *Bullacris* and *Physemacris* as follows : " When alarmed she raises the pronotum at a high angle, and produces an extremely sharp stridulation, nearly equal in intensity to that of a Decticid ".

It is still not definitely known by what mechanism the sounds are produced by females. There is a possibility that they are produced by rubbing the folded vannus of the wing against the abdominal wall. In *Pneumora inanis* the posterior part of the vannus of the wing (Text-fig. 5), is covered with a net of rather strong veinlets between the main vannal veins and both these main veins and the veinlets in this region are covered with small, rather strong teeth (Text-fig. 5). The purpose of these teeth could be stridulatory.

Phallic complex

The phallic complex in Pneumoridae is rather uniform in structure throughout the family. It differs strongly from that of all the other families of Acridoidea. The main feature is its simplicity and a very low degree of sclerotization. Schematically it could be described as a structure relatively small for the size of the body, membranous, consisting of a very simple endophallus, simple ectophallus and weakly sclerotized epiphallus. The ectophallus and endophallus are partly and weakly sclerotized.

The membranous parts of the ectophallus are so soft that on the basis of dry specimens, it is difficult to reconstruct their natural shape. Accordingly, the figures of the phallic complex given below must be regarded only as a near approximation, giving the notion of the shape in its principal parts. They have been drawn as they are and do not look symmetrical because some parts are creased and cramped, and more or less folded. As can be seen from the figures every species has its characteristic features, but it must be remembered that in Pneumorids the ectophallus may be stretched like a concertina, or more telescoped than is shown on the figures, thus changing the visual picture considerably. This stretching and collapsing is a matter of preparedness for copulation and is a natural feature of the organ. The post-mortem position may be of any degree between the two extremes mentioned above. Preparing a specimen for study by maceration or boiling in potassium hydroxide makes it soft, but the natural position of the parts is a matter for conjecture.

The phallic complex of *Bullacris unicolor* is described and figured below in detail, with as much reconstruction as possible of the supposed natural shape. The parts described are present in all the species of the family and differ only in relative sizes and slightly in shape. Since the Pneumorid phallic complex is rather different from that of other Acridoidea, the terminology used for it (Dirsh, 1956) is restricted to a few terms and instead a descriptive procedure is employed.

The phallic complex (Text-fig. 9) of *Bullacris unicolor* (Linnaeus) is a relatively small, membranous structure, some of the parts of which are weakly sclerotized. The epiphallus (A) is large, discoidal, without ancorae, lophi or oval sclerites, but with three tooth-like median projections at the anterior end and with lateral plates (in the same meaning as in other Acridoidea), as well as the posterior projections ; the posterior part of the epiphallus is a weakly sclerotized membrane (B), which should be considered as a part of the epiphallus. The major part of the phallic organ is covered at the dorsal side by the epiphallus (Text-fig. 9). The epiphallus is connected by a membranous fold with the ectophallic membrane, which posteriorly forms a sclerotized transverse part (C) ; the distal end of this part has a folding membranous continuation which is connected by the fold at the distal end with the weakly sclerotized disc-like part of the membrane (D). This disc has been considered as a rudimentary cingulum (Dirsh, 1956), but in fact there is no certainty that it is a homologous or even analogous structure. Accordingly, in this paper, it is referred to as discoidal sclerotization of the ectophallic membrane. The distal part of the discoidal sclerotization forms a membranous fold and is connected with a pair of dorsal, slightly sclerotized lateral valves (*E*) ; the lateral part of these valves is inflated and the dorsal part protrudes upwards and forms a pair of lobes (*F*). The *E* valves at the distal end are joined with a thin-walled sac (*H*) of undefined form. This sac is a continuation of the pair of ventro-posterior valves (*G*). The proximal end of these valves produces a plate-like membranous continuation (*I*). The endophallus is represented by a banana-shaped membranous tube (*L*), on the sides of which there is a pair of longitudinal, rod-like sclerotizations (*M*) ; at the apex its edges merge with the edges of the ectophallus sac, and form a pair of laterally protruding small lobes (*J*), between which is the opening of the endophallus. Ejaculatory duct (*K*) is rather wide.

The structure of the endophallus is extremely simple, without definite division on the ejaculatory and spermatophore sacs, but if the longitudinal sclerotizations are considered as homologous with the penis valves of other Acridoidea then it is possible to consider one of the parts of the sac as the ejaculatory sac and another part as the spermatophore sac.

It may be concluded that the Pneumoridae have the same general plan of structure of the phallic complex as all other Acridoidea but in much simpler form with an undifferentiated ectophallus and endophallus.

Snodgrass, 1957 generalized the phylogenetic development of the male genitalia of insects on the basis of their ontogeny. He offered the theory that all male genital structures were derived from the small ectodermal outgrowth, the primary phallic lobes, which are in fact continuations of the ampullae of the vasa deferentia. They develop later into terminal parts of the internal genitalia.

The study of the phallic complex of adult Pneumorids suggests that their endophallus could be interpreted rather as a simple widening of the vasa deferentia. The ectophallus then represents a secondary external invagination of the endophallus which has acquired a certain degree of differentiation. The epiphallus may be a derivative of this invagination. However, the possibility that it may be derived from the tergal metamere is not excluded.

SPERMATHECA

The spermatheca in Pneumorids, judging from the species in which it was studied, may be divided into two groups. In the first group it is a narrow vermicular tube, with several vermicular diverticula (*Bullacris*, *Physemacris*, *Parabullacris* and *Pneumoracris*). In the second group (*Physophorina*, *Pneumora*) it is a sac-like formation with several large, pocket-like diverticula. These two groups correspond very well with the division of the Pneumorids on the basis of other taxonomic characters.

The spermatheca is structurally one of the simplest in Acridoidea but in Eumastacids it is even simpler. In the latter family the end of the spermatheca, so far as it is known, is a simple pear-shaped widening. It should be noted that the relative size of the spermatheca in Pneumoridae is very large. It is of the same length or longer than the phallic complex of males. In other Acridoidea it is usually smaller.

CHROMOSOMES

According to Helwig, 1958, the karyotype of the males of Pneumoridae is $2n=23$. He does not indicate what genera and species were investigated.

This number of chromosomes of the Pneumoridae is shared with the following families of Acridoidea : Xyronotidae, Trigonopterygidae, Ommexechidae, Pauliniidae, Lentulidae and Acrididae (Helwig, 1958). White (1963) showed that Charilaidae also possesses the same number.

However, Eumastacidae have 17, 19, 21 and 23 chromosomes. Proscopiidae have 17 and Pyrgomorphidae and Pamphagidae both have 19. From this account it is difficult to draw a conclusion concerning the phylogenetic inter-relation of the families. It seems that the families can be divided into three groups : firstly one with 17 to 23 chromosomes, the Eumastacid group ; secondly one with 19, the Pamphagoid group, and thirdly one with 23, the Acridoid group. According to the number of chromosomes the Pneumorids belong to this last group.

EGGS AND EGGPODS

There are no data concerning the eggs or eggpods (if any) and nothing is known about the mode of egg deposition.

The only information available is that in a dry collection a female of *Bullacris discolor*, ready for oviposition, was found in the course of dissection. The eggs were of the usual Acridoid shape. In the dry condition the length of the egg was 7·5 and the width 1·9 mm. After soaking in 10 per cent solution of potassium hydroxide the length of the egg increased to 10·5 and the width to 2·7 mm.

Nothing is known concerning embryonic development.

NYMPHAL STAGES

It is not known how many nymphal instars the Pneumorids have. The scanty material available in museums does not permit one to place nymphal specimens definitely into a species and frequently not even into a genus. Neither can the instars be definitely distinguished. The only case in which the first and last instars are definitely known is *Physophorina livingstoni* (Text-fig. 29). The first instar of this species is 9·5 mm. in length which shows a great difference between the first instar and adult (70–107 mm.).

In the first and subsequent instars, in all observed Pneumorids, the whole body in both sexes is covered above by the relatively huge, crest-like, strongly compressed pronotum. In the later instars the pronotum becomes relatively smaller and the end of the abdomen protrudes posteriorly from it. Sexual dimorphism in wing development was not observed. The pads of male wings, in macropterous species, are hidden under the pronotum as in the females and cannot be detected without dissection.

The inflation of the bodies of the males probably takes place at the last moult. In a few observed nymphs, males of the last instar had bodies of the usual nymphal appearance, being compressed laterally.

The carina on the inner side of the hind femur in stridulating males is readily detectable in the last instar, but the transverse ridges on it are weakly developed. The stridulatory ridges on the abdomen are not detectable in the last instar ; probably they appear at the last moult.

SEXUAL DIMORPHISM

Sexual dimorphism in most genera of Pneumorids is enormous. Males in most genera possess an inflated body, fully developed wings, large ocelli, high and strongly crest-shaped pronotum, and a peculiar sound-producing mechanism ; they are also of smaller size.

In the corresponding females the body is of normal shape, elytra and wings are reduced or strongly reduced, ocelli are vestigial, the pronotum is mostly tectiform or comparatively slightly crested, the sound-producing mechanism is of an entirely different type and the body is larger.

In the group of genera with the male body not inflated, the sexual dimorphism is not so great, but the sexes differ to a greater extent in body size, the males being much smaller than the females ; they differ also in the shape of the pronotum and in the size of the ocelli. The other characters are the same in both sexes.

There is no great sexual dimorphism in coloration or in pattern. In some cases (*Pneumora*) the females are more ornamental than the males, in other cases the females are more uniform than the males (*Bullacris*), but both sexes may be of the same uniform colour (*Physophorina*) or of the same pattern (*Pneumoracris*).

It is interesting to note that in the nymphs, even of the last instar, sexual dimorphism is hardly pronounced at all except in the external genital appendages. The wings in both sexes are hidden under the pronotum ; the body is of the same compressed shape ; the pronotum is the same crest-shaped, strongly compressed structure and more resembles that of the adult males than the adult females. The most striking features of the sexual dimorphism appear only after the last moult.

BEHAVIOUR

Almost nothing is known about the behaviour of Pneumorids. It was observed, first by Thunberg in 1772 and confirmed later, that they are nocturnal. The males are attracted towards light. Sometimes they fly into an open camp-fire and their inflated bodies characteristically explode in the flames.

They were heard and observed on bushes, trees and low ground vegetation.

Thunberg's observations in 1772 and the observations of later authors suggest that Pneumorids, particularly the males, in day time are confined to the trees and descend at night to the ground and lower vegetation.

It is possible that the males and females differ in their daily regimes, and also that their habits and the development of the ocelli are connected ; the ocelli in the males are exceptionally large, while in females they are vestigial.

The song or call of males begins, in the case of *Physemacris variolosus*, at 10–11 o'clock p.m. Other species usually begin to call after midnight (Van Son, 1963, in litt.). Females emit an answering call. Unfortunately no other activities of their life have been observed.

FOOD

As the structure of the mandibles suggest, the Pneumoridae are forbivorous, i.e. feed on comparatively soft leaves of herbs.

The existing records are: *Physophorina miranda* was observed feeding on *Berkheya amplexicaulis* Hoffman, 1891, Compositae (Van Son, 1958) ; *Bullacris* sp. and *Physemacris variolosa* on *Elytropappus rhinocerotis* Lessing, 1832, Compositae ; and *Bullacris longicornis* on *Plectranthus* sp., Labiatae (Van Son, 1963, in litt.).

GEOGRAPHICAL DISTRIBUTION

Pneumoridae are confined chiefly to Southern Africa. They are distributed in the coastal areas in the west, south of the Orange River, along the western coast, and also along the southern and eastern coasts. There are no reliable records from inland* and it seems that almost all existing records for Southern Africa are confined to Cape Province and Natal. Only one genus (*Physophorina*) is recorded as far north as Nyasaland, Tanganyika and Uganda (Map 7). There is also a single record for *Bullacris membracioides* from Nyasaland (Map 7).

Is this peculiar distribution the result of ecological selectiveness of the insects or is it that the area is poorly explored in this respect? A definite answer cannot be given. It is clear that the Pneumorids are highly localized, but little is known about their ecological requirements. Judging from the meagre material available, they are probably difficult to detect in nature.

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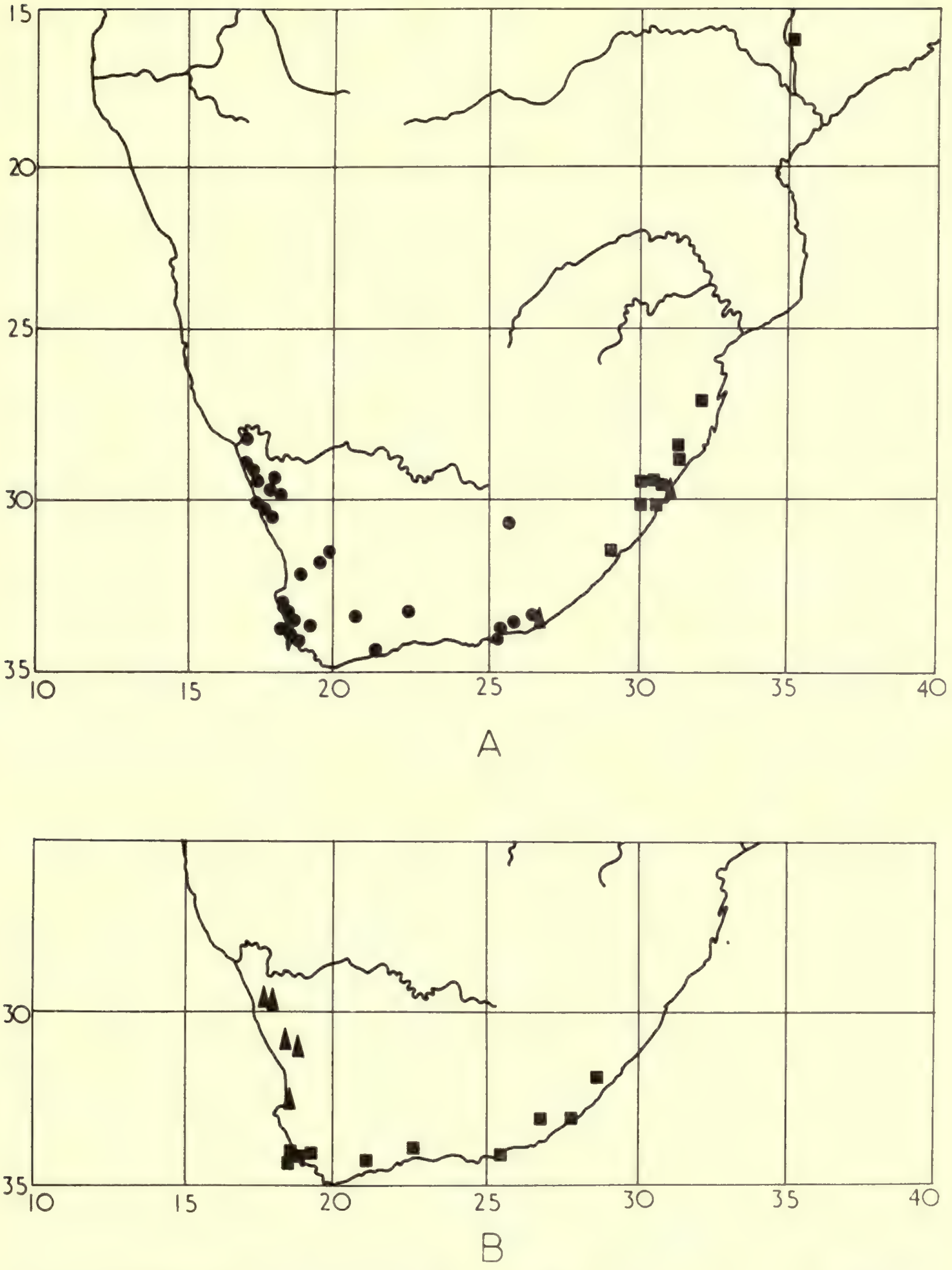
* There is one record by Rehn 1941, of a nymphal specimen of *Bullacris* from Pretoria (Transvaal). However, the record is doubtful and may be the result of wrong labelling.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A
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40
B

FIG. 6. Geographical distribution. Map A. ●—*Bullacris unicolor.* ■—*Bullacris membracioides.* ▲—*Bullacris intermedia.* Map B. ■—*Bullacris discolor.* ▲—*Parabullacris vansoni.*

Only one species, *Physophorina livingstoni*, reaches as far as Uganda and few records of it are from East Africa. Most probably this species penetrated northwards from the main area of the family.

From the geographical distribution it is clear that the family can be regarded as primarily endemic in South Africa.

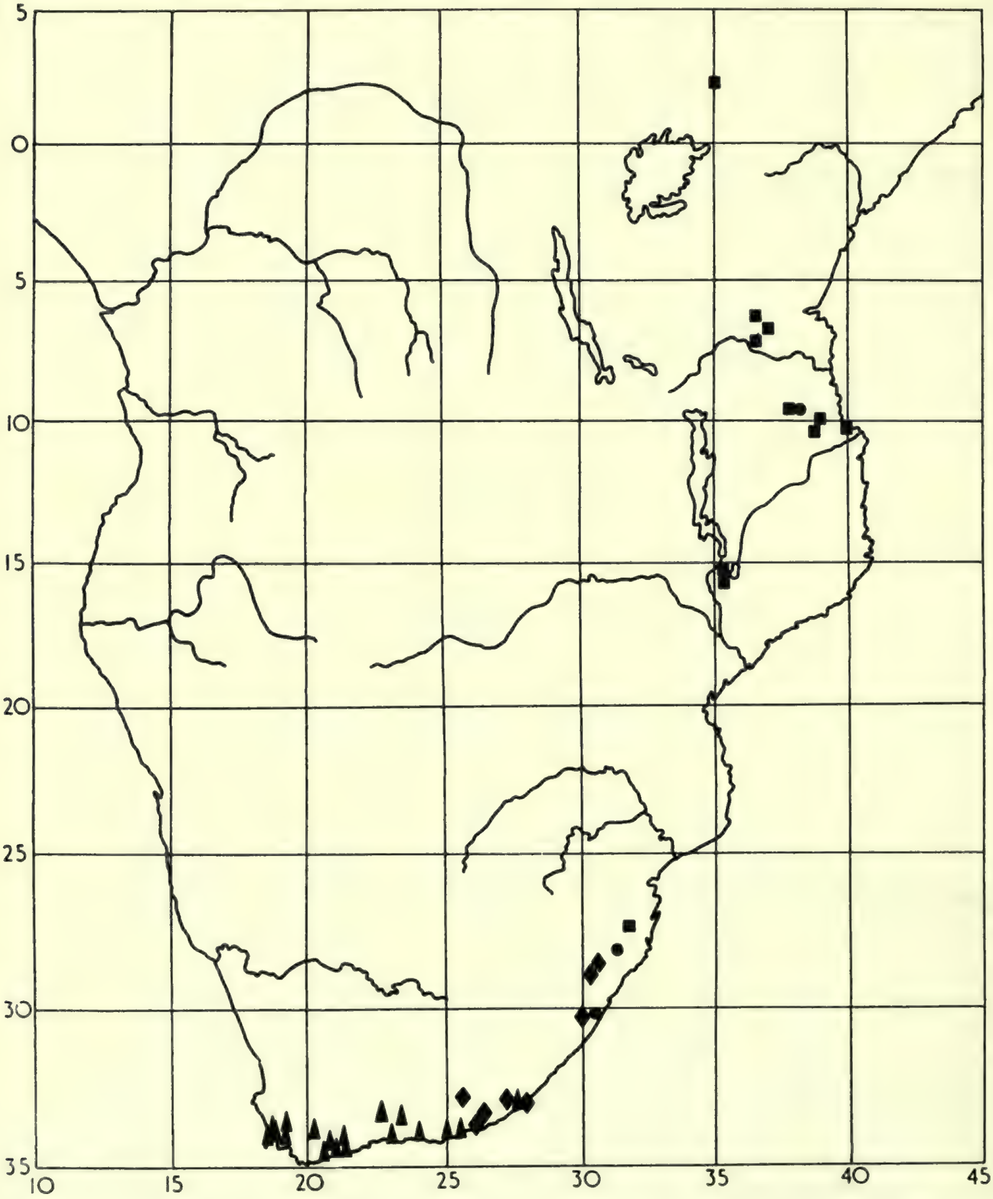

FIG. 7. Geographical distribution. ■—*Physophorina livingstoni*. ●—*Physophorina miranda*. ◆—*Pneumora inanis*. ▲—*Physemacris variolosa*.

NOTE ON THE GROUP OF GENERA WITH NON-INFLATED MALE BODY

When the first species of the Pneumorids with a non-inflated male body was studied, it was of great interest to compare it with the species which possess an inflated male body. A second and third species increased the interest and the riddle of this unusual male character.

The males of the species with non-inflated bodies differ from those with inflated bodies not only in the shape of the body but also in the absence, or reduction to a highly vestigial form, of the stridulatory mechanism, the reduction of elytra and wings to vestigial form, the shape of the pronotum and the structure of the phallic complex.

However, in one case in which the males are not inflated the females are so similar to those of another species, in which the male has an inflated body, that it is extremely difficult to distinguish them. These species are *Parabullacris vansoni* Dirsh and *Bullacris unicolor* Linnaeus, respectively.

Pneumoracris browni Dirsh could be regarded as parallel to *Peringueyacris namaqua* (Péringuey) in the characteristic pattern of the pronotum, but the female of the latter species is unknown.

In *Paraphysemacris spinosus* Dirsh only the male is known. In its pattern and the shape of the pronotum it is very similar to *Physemacris variolosa* Linnaeus. They may be regarded as parallel species. The females of these two species may be indistinguishable.

The interrelation of this group of genera with other genera and species with inflated bodies is not yet understood. However, the possibility could be considered that these species are not parallel to the species with inflated bodies, but represent neotenic forms of them.*

AFFINITIES OF THE FAMILY

There is no fossil evidence which can help to establish the relationship of the Pneumorids with the other families of Acridoidea or with the other groups of Orthoptera. At present only the study of the comparative morphology of the group can provide some indirect clues.

There is very little concerning this question in the literature. Rehn, 1941 expressed the opinion that the Pneumorids are an ancient group, equivalent to the Tetrigoidea. Smart, 1953 stated that the wing venation of Pneumorid males is " remarkably primitive ", implying primitiveness of the family. Ragge, 1955 considered the wing venation of Pneumorids as the most primitive of all Acridoidea. He considered them as derived from the general Acridoidea stock even earlier than Locustopsidae, and earlier than the other branches of Acridoidea.

*Dr. G. van Son, of Transvaal Museum, who has observed the species in nature and with whom I discussed the possibility of the existence of neoteny in the above mentioned species, wrote to me that it is his " firm opinion that they (the species with non-inflated bodies) did represent nymphal forms of males in which the genitalia had apparently reached full development in advance of the remainder of the morphological characters ".

Not dismissing entirely the possibility of the existence of neoteny in the species, I think that there is still not enough material to prove it sufficiently.

It seems that most authors consider the Pneumorids as a group more primitive than other Acridoidea. However, the term " primitive " is greatly misused. In the case of the Pneumorids it can be stated that some of their characters are extremely simple, but whether they are primitive or just simple, or are the result of secondary simplification, is a matter for speculation.

One can consider the Pneumorids as members of the suborder Acridoidea, since their characters fit into it very well. They have the same head sclerites as the other Acridoidea ; the same short antennae ; principally the same wing venation ; the same three-segmented tarsi ; the same arolia, and the same four-valved, short ovipositor. From the morphological point of view at present there is no doubt that they have the same characters as the taxon named Acridoidea (sensu Dirsh, 1961).

However, there are several characters which separate Pneumorids from other Acridoidea, making them a distinctly isolated group.

These characters are discussed below :— The wing venation as already explained is extremely simple in the Pneumorids. Ragge, 1955 showed that morphologically they are extremely close to the fossil Palaeodictyoptera—*Stenodictya lobata* Brongniart (Fam. Dictyoneuridae). But it is not conceivable that they were derived directly and primarily from the Palaeodictyoptera stock, as they have too many other characters in common with Acridoidea in the recent concept of this suborder. In 1963 Ragge considered that the " wing venation of the *Pneumoridae* suggests a close relationship with the remaining Acridoidea ".

Thus, on the one hand the venation of the Pneumorids is very similar to that of the Dictyoneuridae and on the other hand it is closely related to that of Acridoidea. This can lead to only two possibilities : firstly, that the Pneumorids retained the characters of the ancient Palaeodictyoptera during their phylogeny and branched independently from the Acridoidea, but developed a parallel set of characters ; and secondly that the wings of Pneumorids are the result of the secondary simplification. In the latter case the Pneumorids may have branched early from the common Acridoidea stock and possibly lost or reduced the function of the wings. As a result the wings would degenerate to a simplified form, very similar to the primitive Palaeodictyoptera Dictyoneuridae.

Neither explanation can be verified. However, in other Acridoidea there are cases where, in generally micropterous species (e.g. females of *Chrysochraon*, and *Rubellia*), freak specimens occur with long wings, which are of the same type as other species of the group to which they belong, but possess simplified venation. These cases may be considered to some extent as parallel to the Pneumorids, with the difference that macropterous forms may appear in some genera of other families sporadically, whereas in the Pneumorids they appeared and persisted and the simplification may have become fixed genetically. In any case, there is no doubt now that wing venation is not an extremely rigid arrangement. The idea that the main veins are formed around the tracheae has been questioned recently (Whitten, 1962).

The phallic complex of Pneumorids is extremely uniform for the whole group. It indicates that as a taxon they do not diverge very much between themselves. It might also indicate that the group is comparatively young ; but this is not a permissible conclusion. Some characters are very persistent and remain unchanged for a long time during the phylogeny of a group or branch. We are reminded of the simple and very persistent character of the five branched extremities which persist in Amphibia, Reptilia, Aves and Mammals to Man. Many other examples of this kind can be found in any branch of the Animal Kingdom.

The structure of the phallic complex is also extremely simple. It is simple so that one almost involuntarily regards it as primitive. However, in this case also there is no positive proof. It is true that the phallic complex of Pneumorids is very different from that of other Acridoidea studied to date, and the family may be distinguished by this character alone. But there are several characters of similarity : the presence of the epiphallus, similar differentiation into ectophallus and endophallus, and traces, if correctly interpreted, of a rudimentary cingulum and penis or analogous structures. These characters connect Pneumorids with the rest of Acridoidea in their general features. It is interesting to note, however, that the Pneumorid phallic complex is remotely similar to the corresponding structure in Tettigonioidea and Gryllacridoidea (Snodgrass, 1937). If one considers that Tettigonioidea and Gryllacridoidea are more primitive than Acridoidea, then it may be inferred that the Pneumorids are more primitive than the other Acridoidea.

Although very simple in respect of wings and genital structures Pneumorids, however, display a very high degree of specialization in their sound-producing mechanism. In fact, it is unique in that the whole body of the male, being inflated, is adapted for this purpose. There are similar abdominal-femoral stridulatory mechanisms in Tanaoceridae (Dirsh, 1955) and Xyronotidae (Kevan, 1952, Dirsh, 1955), but they are less specialized, not having inflated bodies. This specialization in the Pneumorids is probably of very ancient origin, as the males without inflated bodies still retain in vestigial form the same stridulatory mechanism.

When and how the sound-producing mechanism originated in the Pneumorids can be solved only on the basis of fossil material, which at present is lacking. It should be noted that analogous stridulatory mechanisms exist in certain groups of Gryllacridoidea, but this could, however, be coincidental and an independent parallel development. A second possibility is that this character was primarily developed in a common ancestral stock of Orthopteroid insects and was retained in Pneumoridae, Tanaoceridae and Xyronotidae, reaching the highest point of specialization in the Pneumoridae.

Another interesting point is that although Pneumorids produce much noise, they do not possess a tympanal organ, which is considered as an organ of sound perception. Probably they have some other kind of organ for sound perception, as yet unknown. It is known, however, that there is a great variety of these organs in various groups of insects (Haskell, 1961). The tympanal organ exists only in Orthopteroids, in Hemiptera and Lepidoptera. In Acridoidea it is present in six out of fourteen families of the suborder.

It is absent in all the families with an abdomino-femoral sound producing mechanism. In Gryllacridoidea, the group possessing the abdomino-femoral mechanism, the tympanal organ (on the front tibia) is absent, while in some groups without the mechanism the tympanal organ is present. As the tympanal organ is present in Acridoidea in the more advanced families and subfamilies, it is possible to deduce that the groups that lack it are primitive.

There is another character which is common to all Acridoidea, except those groups of which the hind legs approximate to the cursorial type. This is the Brunner's organ. It is absent completely in Proscopiidae and greatly reduced in the genus *Psednura* (Pyrgomorphidae), which have also hind legs functionally approximating to the cursorial type. In Pneumorids in some species the Brunner's organ is absent, in some it is hardly detectable and in others it is fairly well developed. This indicates that primarily the Pneumorids possessed the Brunner's organ, and that it has undergone reduction in some species in connection with the lessening of jumping ability. According to this character they are nearer to the Acridoid stock than to the earlier Orthopteroid stock, Brunner's organ being found in Acridoidea only.

As is shown above, the Pneumorids have several characters which are rather contradictory phylogenetically. Almost every character may be considered from more than one point of view and there is no direct verification of any of them owing to lack of fossil data.

From the indirect considerations presented above, it can be concluded that Pneumorids branched very early from the same stock as the rest of Acridoidea and approximately at the same time as Locustopsidea and Acridoidea.

Family **PNEUMORIDAE**

Antennae short. Head short, with shortened fastigium of vertex ; face vertical, frontal ridge absent ; fine fastigial furrow present. Ocelli large or vestigial. Prosternal process absent. Venation simple ; elytra without vannal flex, wing with remigium almost as large as vannus. Tympanum absent. Stridulatory mechanism mostly present in male, consisting of a row of transverse ridges on sides of third abdominal tergite and serrated ridge on internal side of hind femur. Hind legs almost cursorial ; lower basal lobe of hind femur longer than upper ; Brunner's organ present, vestigial or absent. Phallic complex simple ; ectophallus sac-like, with rudimentary sclerotizations ; endophallus simple, tube-like ; epiphallus plate-like, without lophi and ancorae ; oval sclerites absent. Spermatheca large, with several vermicular or pocket-like diverticula.

Type genus : *Pneumora* Thunberg, 1775.

KEY TO GENERA

1 (12) Body of males strongly inflated, bladder-like. Elytra and wings fully developed. Females micropterous with elytra sclerotized, or brachypterous with elytra membranous.

2 (9) Anterior cubital vein of male elytron unbranched. Lateral ocelli placed above and slightly internally to antennal bases.

3 (8) Lower lobe of hind knee without tooth on lower margin. Females micropterous, with elytra sclerotized.

4 (5) Pronotum in profile regularly arcuate (Text-figs. 10, 11, 13, 15, 17, 19.) ***BULLACRIS*** (p. 353)

5 (4) Pronotum in profile not regularly arcuate, with deep constriction at posterior transverse sulcus.

6 (7) Median carina in prozona forming two or three large teeth (Text-fig. 22). ***PHYSEMACRIS*** (p. 371)

7 (6) Median carina of pronotum low, in prozona with tubercle-like thickening (Text-fig. 25) . . . . ***PERINGUEYACRIS*** (p. 375)

8 (3) Lower lobe of hind knee with large tooth on base of lower margin. Female brachypterous, with elytra membranous (Text-fig. 26). . ***PROSTALIA*** (p. 377)

9 (2) Anterior cubital vein of male elytron branched. Lateral ocelli above and slightly externally to antennal bases.

10 (11) Pronotum highly arcuate and strongly inflated, particularly in females (Text-fig. 28). . . . . ***PHYSOPHORINA*** (p. 379)

11 (10) Pronotum low arcuate and not inflated in both sexes. (Text-fig. 32). ***PNEUMORA*** (p. 385)

12 (1) Body of males not inflated, of usual acridoid shape in both sexes. Elytra and wings vestigial in both sexes and completely hidden under pronotum.

13 (14) Pronotum in profile regularly arcuate (Text-fig. 34) ***PARABULLACRIS*** (p. 388)

14 (13) Pronotum in profile not regularly arcuate, with constriction at posterior transverse sulcus.

15 (16) Median carina of pronotum at posterior end of prozona and anterior end of metazona tubercle-like widened (Text-fig. 36). . ***PNEUMORACRIS*** (p. 389)

16 (15) Pronotum with three large teeth in prozona, median carina serrated in metazona (Text-fig. 38) . . . . . . ***PARAPHYSEMACRIS*** (p. 392)

BULLACRIS Roberts, 1941

Bulla Stål, 1873 : 137 (nec Linnaeus, 1758)
Bullacris Roberts, 1941 : 18 [n.n.]

Anterior part of body of male down to seventh abdominal segment strongly bladder-like, inflated ; end of abdomen of usual cylindrical shape. In female, body normal, compressed laterally. Antenna filiform or slightly club-like, widened at apex. Face slightly convex or flat. Frons angularly or roundly merging with vertex. Lateral ocelli placed above and slightly internally to antennal bases ; in male all three ocelli very large, in female small, vestigial. Compound eyes in both sexes small, oval, moderately convex. Pronotum highly arcuate, crest-like or low arcuate, crossed by four transverse sulci ; median carina sharp, in females roughly serrated ; prozona much shorter than metazona ; metazona elongated with angular posterior margin ; episternum toothed. Mesosternal interspace deeply concave. Male fully winged ; anterior cubital vein of elytron unbranched. Female elytra and wings strongly shortened, covered by pronotum or slightly protruding from under lateral margins of metazona ; costal and subcostal area of elytron strongly sclerotized ; wing about twice as long as elytron, weak, longitudinally folded once only along vannal flex. Third abdominal tergite of male with crescent-like row of strong stridulatory ridges. Anterior and middle femora often strongly tuberculate ; hind femur weak, short, almost cursorial ; in male, internal side of hind femur with short, high carina, bearing row of transverse ridges, forming second part of stridulatory mechanism ; Brunner's organ absent or vestigial, hardly detectable. Arolium large. Supra-anal plate in both sexes simple, angular, with deep transverse sides. Cerci short, conical. Subgenital plate in male short, acutely conical, at apex excised or truncate ; in female with angular apex. Ovipositor moderately short, with straight valves, obtuse at apices.

Phallic complex weakly sclerotized ; lateral parts of ectophallus slightly sclerotized ; dorsal part consisting of a pair of lateral, inflated valves ; ventro-posterior part sac-like, membranous ; between these parts, opening of endophallus is located. Endophallus with a pair of lateral,

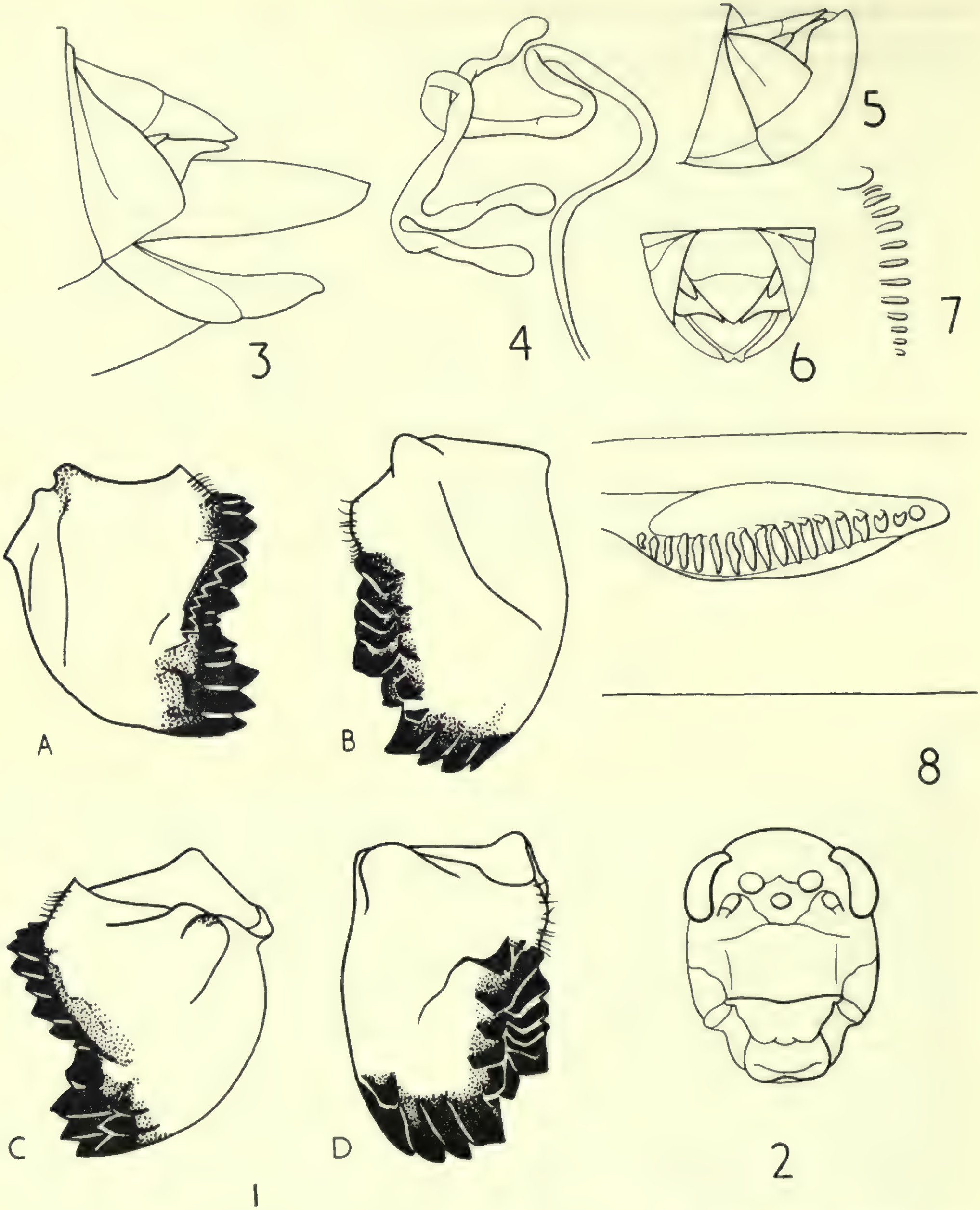

Fig. 8. *Bullacris unicolor*. 1, mandibles : Right mandible—A, outside ; C, inside. Left mandible—B, outside ; D, inside. 2, face of male, showing position of the ocelli in relation to the antennal bases. 3, end of female abdomen, lateral view. 4, spermatheca. 5, end of male abdomen, lateral view. 6, the same from above. 7, abdominal stridulatory ridges (semi-schematic). 8, stridulatory ridges of the internal side of hind femur.

narrow, longitudinal sclerotizations. Ephiphallus short and wide, with long lateral plates and three strong median apical teeth.

Spermatheca with several narrow, vermicular, irregularly twisted diverticula.

Type species : *Gryllus Bulla unicolor* Linnaeus, 1758.

Key to Species

MALES

1 (2) Antenna slightly club-like widened at apical part (Text-fig. 10). Supra-anal plate comparatively short and widely angular (Text-fig. 8) ***unicolor*** (Linnaeus)
2 (1) Antenna filiform. Supra-anal plate comparatively long and narrow, angular.
3 (6) Pronotum in profile highly arcuate (Text-figs. 11, 13).
4 (5) Pronotum in profile regularly arcuate (Text-fig. 11). Third episternum with brown patch. Size smaller (44–49 mm.) . . ***intermedia*** (Péringuey)
5 (4) Arc of pronotum, in profile, lower in prozona (Text-fig. 13). Third episternum without brown patch. Size larger (47–59 mm.) (Text-fig. 13) ***membracioides*** (Walker)
6 (3) Pronotum in profile low arcuate.
7 (10) Pronotum in profile regularly arcuate (Text-figs. 15, 17). Third abdominal tergite with 9–10 stridulatory ridges. Size larger (44–58 mm.).
8 (9) Pronotum without callosities. Veinlets of reticulation of elytra of the same colour as membrane. Sides of abdomen with ocellate pattern (Text-fig. 15) ***discolor*** (Thunberg)
9 (8) Pronotum with whitish callosities. Veinlets of reticulation of elytra darkened. Sides of abdomen with ocellate and marble pattern (Text-fig. 17) ***serrata*** (Thunberg)
10 (7) Arc of pronotum in profile lower in prozona. Third abdominal tergite with 13 stridulatory ridges. Size smaller (41–46 mm.) (Text-fig. 19) ***obliqua*** (Thunberg)

FEMALES

1 (4) Arc of pronotum in profile comparatively high (Text-figs. 11, 13).
2 (3) Smaller size (42 mm.) (Text-fig. 11) . . . . ***intermedia*** (Péringuey)
3 (2) Larger size (48–55 mm.) (Text-fig. 13) . . ***membracioides*** (Walker)
4 (1) Arc of pronotum in profile comparatively low.
5 (6) Pronotum narrow, slender (Text-fig. 10) . . . ***unicolor*** (Linnaeus)
6 (5) Pronotum comparatively wide, robust.
7 (8) Pronotum without dorsal callosities or with only traces of them (Text-fig. 15) ***discolor*** (Thunberg)
8 (7) Pronotum with dorsal callosities forming oblique whitish stripes.
9 (10) Dorsum of pronotum with convex sides and comparatively low obtuse median carina (Text-fig. 17) . . . . ***serrata*** (Thunberg)
10 (9) Dorsum of pronotum with slightly concave sides and sharp median carina.
11 (12) General coloration greenish ; sides of abdomen with four rows of small whitish, oblique spots (Text-fig. 19) . . . . . . ***obliqua*** (Thunberg)
12 (11) General coloration pale brownish ; sides of abdomen with two rows of large, whitish spots of irregular form (Text-fig. 21) . ***boschimana*** (Péringuey)

Bullacris unicolor (Linnaeus, 1758)

(Text-figs. 8–10)

Gryllus Bulla unicolor Linnaeus, 1758 : 427. ♂.
Pneumora immaculata Thunberg, 1775 : 256. ♂ , **syn. n.**
Pneumora rubens Thunberg, 1810 : 58. ♂, [Syn. Kirby, 1910 : 62].
Mantis paradoxa Stoll, 1813 : 79. ♂ [Syn. Serville, 1838 : 716.]
Gryllus Locusta pulicarius Stoll, 1813 : 37. ♂ [Syn. Serville, 1838 : 716].

Gryllus Locusta vinaceus Stoll, 1813 : 37. ♂ [Syn. Kirby, 1910 : 62].
Bullacris unicolor (Linnaeus) Roberts, 1941 : 19.
Bullacris thalassina Rehn, 1941 : 141. ♂ **syn. n.**
Bullacris namaquensis Rehn, 1941 : 144. ♂, **syn. n.**

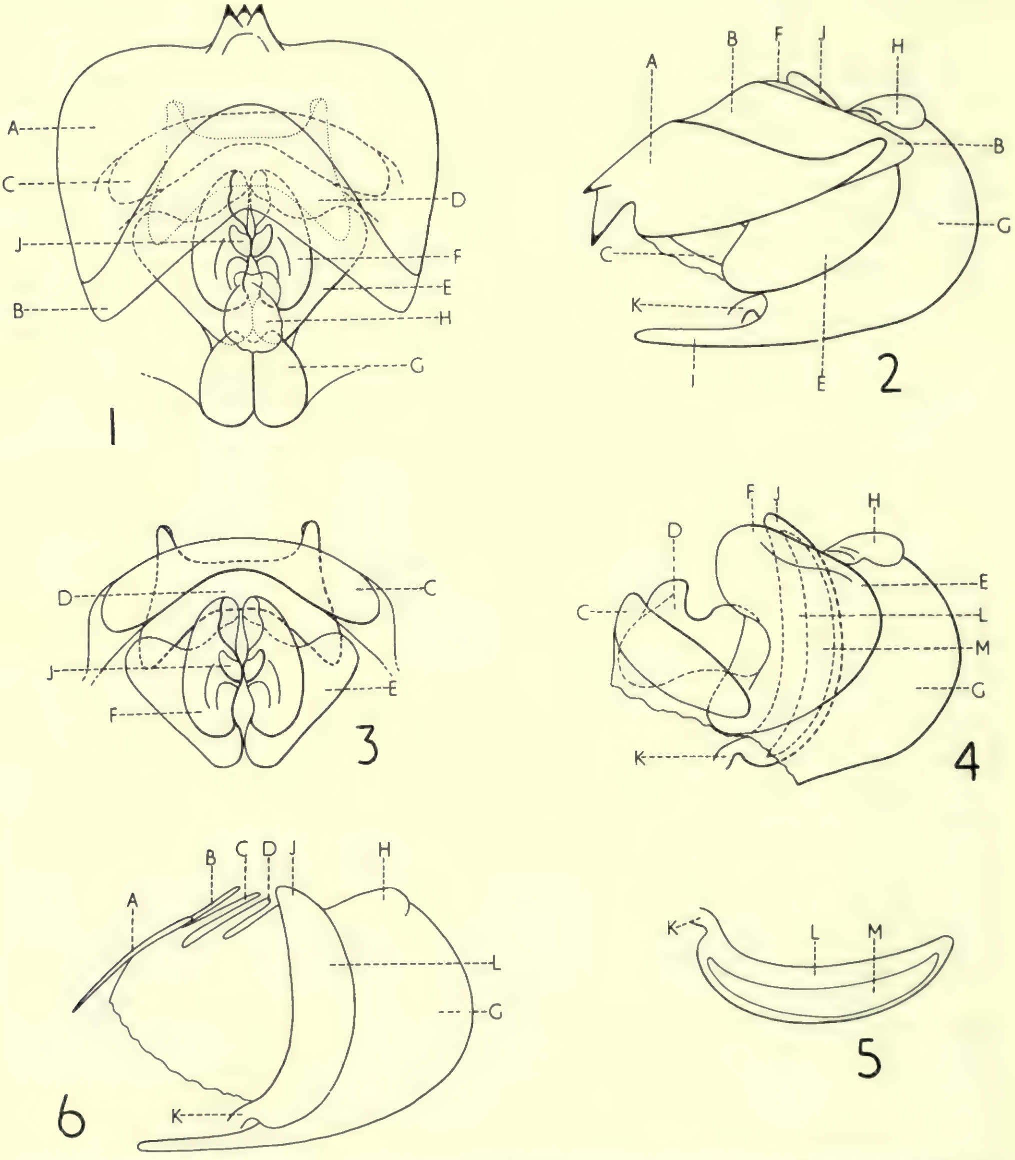

FIG. 9. *Bullacris unicolor*. Phallic complex. 1, whole phallic complex from above. 2, the same, lateral view. 3, phallic complex from above, but epiphallus removed. 4, the same, lateral view. 5, endophallus, lateral view. 6, schematic saggital section of the phallic complex. (For lettering for this and all following figures of the phallic complex—see text. The phallic complex and spermatheca are drawn under the same magnification.)

♂. Large. Integument on head and thorax rugose, granulose and slightly hirsute, on abdomen smooth. Antenna 18–20-segmented, at apex slightly club-like widened, with segments shortened and deeply separated. Head relatively small, strongly rugose, granulose and hairy; frons slightly convex, roundly merging with vertex ; fastigial furrow faint. Pronotum in profile moderately arcuate, with shallow depression between prozona and metazona, median carina in profile downcurved at posterior sulcus ; anterior margin of prozona angularly protruding forwards, its median carina between sulci with transverse wrinkles ; metazona in posterior part, at sides of median carina, depressed, median part compressed ; lateral carinae in anterior part of metazona weak, gradually fading backwards. Third abdominal tergite with 11–13 stridulatory ridges. Anterior and middle legs without tubercles. Hind femur short and weak ; Brunner's organ undetectable. Supra-anal plate short, widely angular ; subgenital plate short, angular with bilobate apex.

Phallic complex with comparatively strongly sclerotised lateral parts of ectophallus and comparatively strongly sclerotised dorsal part of membrane.

General coloration light green, straw-yellowish, pinkish or reddish. Third episternum in upper two thirds, brown ; side of abdomen uniformly coloured or with three or four brown spots with white centres.

♀. Large. Integument not hairy. Antenna 17–19-segmented, scarcely club-like at apex. Head relatively large ; face flattened ; fastigial furrow hardly detectable. Pronotum in profile very low arcuate, without depression between prozona and metazona ; prozona without transverse wrinkles ; metazona strongly elongated, narrow angular. Elytra and wings shortened, completely covered by pronotum ; elytron half the length of wing, of elliptical shape with costal area sclerotized. Subgenital plate with angular apex.

Spermatheca with three long, narrow, vermicular diverticula.

General coloration green or olive-green ; posterior margin of metazona in region where it is merging with lateral lobe of pronotum whitish or yellowish, with blackish stripe in adjoining part of pleuron ; sclerotized part of elytron bright red, with blackish stripe along subcostal area ; abdomen sometimes with three or four faint yellowish spots.

Length of body ♂ 35–45 ; ♀ 38–44 ; pronotum ♂ 15–21, ♀ 22–24 ; elytron ♂ 29–36, ♀ 4–5 ; hind femur ♂ 11–12·5, ♀ 10·5–12 mm.

Variability : Body size varies little in both sexes (see measurements). Pronotum varies in its length, in height of arcuated part of dorsum, deepness of depression of median carina at posterior transverse sulcus and deepness of lateral depression of metazona in males. Supra-anal plate in males may be more or less acutangular. Incision at apex of subgenital plate varies in deepness. Coloration in males green, greenish, yellowish, pinkish to reddish ; median carina of pronotum sometimes yellowish ; abdomen uniformly coloured or more frequently on sides with three or four brown spots with white centres ; elytra sometimes sparsely covered with brownish dots. In females general coloration more uniform, mostly olive-green ; pronotum uniformly coloured, but stripe on lower margin of metazona varies from white to yellow and sometimes almost disappears ; spots on both sides of abdomen vary in their intensity, sometimes undetectable.

Material examined. 67 ♂, 12 ♀. Lectotype, ♂. Type locality according to description : " Habitat in Indiis " (erroneous). (Lovisa Ulrika Collection in Uppsala). Syntypes 2♂. As above.

The Thunberg types and syntypes mentioned in the synonymy are without locality labels.

Cape Province : Kuils River, Stellenbosch ; Saldanha Bay ; Tygerberg Hills ; Somerset West ; Langebaan ; Port Elizabeth, Redhouse ; Still Bay ; Eland Bay, Leipoldtville ; Cradock ; Alicedale ; Robben Isl. ; Darling ; Doornbosch, between

Calvinia and Clanwilliam ; Calvinia ; Clanwilliam ; Matjesfontein ; Willowmore ; Steinkopf ; Fishhoek ; Grahamstown ; Wallekraal ; Kleinzee ; Gelykwerk ; Richtersveld ; Nababiep ; Springbok ; Hondeklip Bay ; Port Nolloth ; O'okiep ; O'ograbies. December to May.

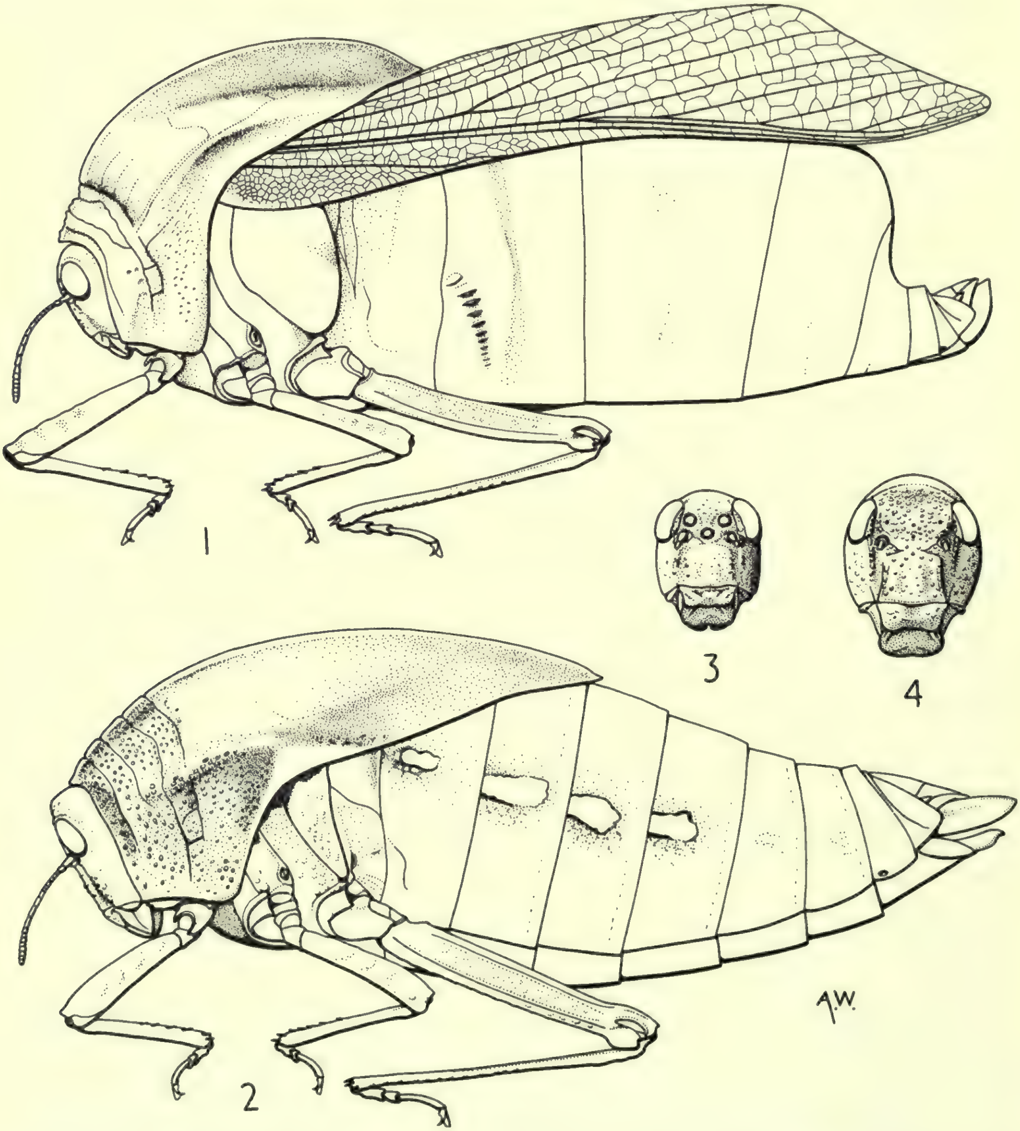

FIG. 10. *Bullacris unicolor*. 1, male. 2, female. 3, male face. 4, female face.

Bullacris intermedia (Péringuey, 1916)

(Text-figs. 11, 12)

Bulla intermedia Péringuey, 1916 : 407. ♂.
Bullacris intermedia (Péringuey) Johnston, 1956 : 29.

♂. Integument of head and pronotum rugose and sparsely hairy. Antenna 20-segmented, filiform, with segments slightly or not at all elongated. Head relatively small ; frons slightly convex, roundly merging with vertex ; fastigial furrow faint. Pronotum in profile highly and

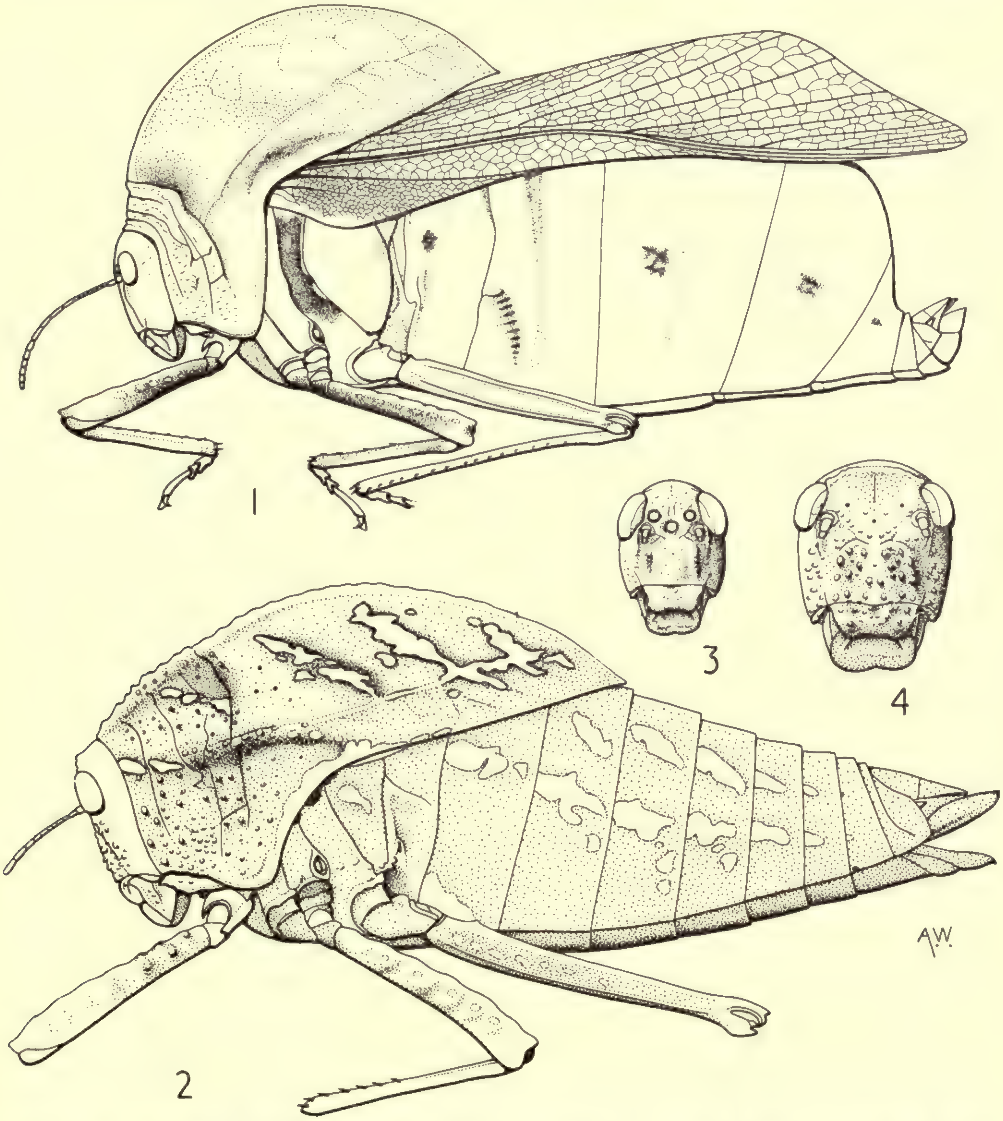

FIG. 11. *Bullacris intermedia*. 1, male. 2, female. 3, male face. 4, female face.

regularly arcuate on whole length, with slight lateral depressions ; anterior marign of prozona angularly protruding forwards, its median carina between sulci with transverse wrinkles ; sides of metazona convex ; lateral carinae weak. Third abdominal tergite with 9–10 stridulatory ridges. Anterior and middle legs without tubercles. Hind femur weak. Brunner's organ vestigial, hardly detectable. Supra-anal plate narrow angular ; subgenital plate short, angular, with incised apex.

Phallic complex with comparatively weakly sclerotized lateral parts of ectophallus and comparatively weakly sclerotized dorsal part of membrane.

General coloration green. Third episternum with brown patch ; sides of abdomen with three or four small brownish spots or uniformly coloured.

♀. Integument of head and pronotum rugose, of abdomen smooth. Antenna filiform. Head large ; face flat, frons angularly merging with vertex. Pronotum highly and regularly arcuate ; sides of dorsum with four oblique callosities ; median carina, in profile, roughly serrated, particularly in prozona ; anterior margin of prozona not protruding forwards ; lateral carinae well pronounced. Elytra and wings strongly shortened, covered by pronotum, except narrow margin of elytron, which protrudes slightly from under lateral margin of metazona ; elytron much shorter than wing, of oval form, with strongly sclerotized costal and subcostal areas. Anterior and middle femora slightly tuberculate ; hind femur weak ; Brunner's organ not detectable. Apex of subgenital plate angular.

General coloration green ; callosities of pronotum whitish ; posterior margin of lateral lobe of pronotum whitish ; sclerotized part of elytron bright red ; sides of abdomen with three rows of whitish oblique spots.

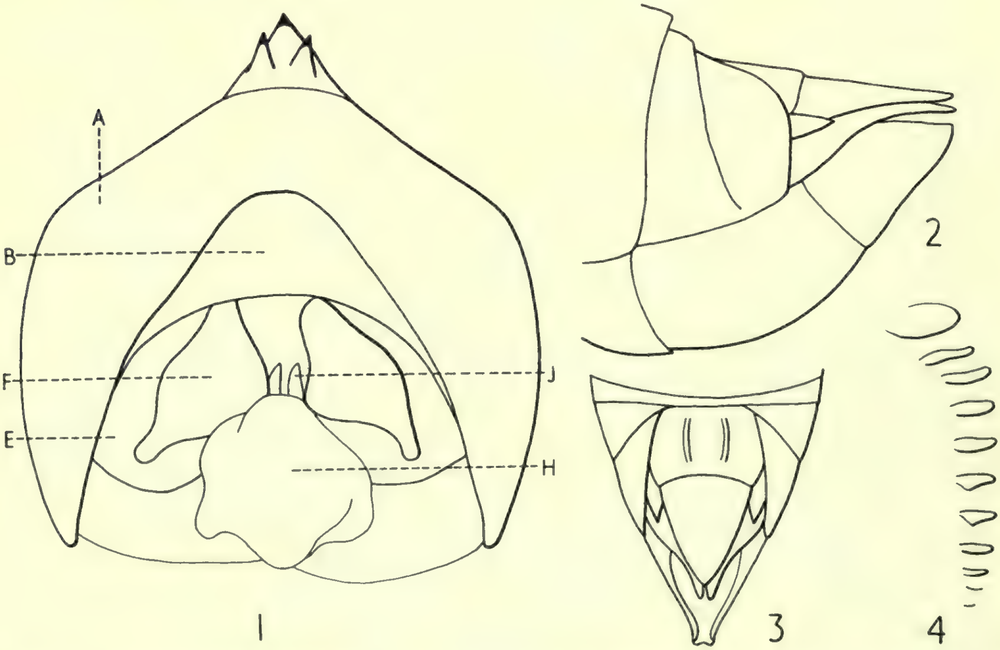

FIG. 12. *Bullacris intermedia.* 1, phallic complex from above. 2, end of male abdomen, lateral view. 3, the same, from above. 4, abdominal stridulatory ridges (semi-schematic).

Length of body ♂ 44–49, ♀ 42 ; pronotum ♂ 20–22, ♀ 24 ; elytron ♂ 36–37 ; hind femur ♂ 13–14, ♀ 16 mm.

Variability : Only a few male specimens are known ; they are rather uniform in appearance. One specimen has venation and reticulation in basal part of elytra brownish.

This species is very near to *B. membracioides* (Walk.) and also, but to a lesser extent, to *B. unicolor* L. Since only a few males are available, it is difficult to decide if it is a good species or merely a local race of *B. membracioides*.

Material examined. Type ♂. Type Locality : " Cape Colony. Kiwie River ". (South African Museum, Cape Town).

CAPE PROVINCE : Kowie River 2 ♂ ; Port Alfred 1 ♀ ; " Natal " 1 ♀.

Bullacris membracioides (Walker, 1870) **comb. n.**

(Text-figs. 13, 14)

Pneumora membracioides Walker, 1870 : 800. ♂ nymph.
Bulla longicornis Stål, 1873 : 139. **syn. n.**

♂ type. Integument of head and thorax rugose and granulose. Antenna comparatively long, 23-segmented, filiform, with elongated segments. Head relatively large, strongly granulose, frons almost flat, slightly convex, angularly merging with vertex ; fastigial furrow sharp. Pronotum in profile highly and regularly arcuate in metazona, and lowered in prozona, without depression between prozona and metazona ; anterior margin of prozona slightly angularly protruding forwards, its median carina, between sulci with transverse wrinkles ; sides of metazona convex ; only traces of lateral carinae exist. Second abdominal tergite with 9 stridulatory ridges. Anterior femur tuberculate ; hind femur moderately short ; Brunner's organ undetectable. Supra-anal plate narrow angular ; subgenital plate moderately long, angular, with slightly excised apex.

Phallic complex with weakly sclerotized lateral parts of ectophallus and moderately sclerotized dorsal part of membrane.

General coloration from green to straw-yellowish, mostly uniform, sometimes on sides of abdomen 3–7 brownish spots.

♀. Integument on head and pronotum rugose. Antenna 23-segmented, filiform. Head large granulose, frons flat, angularly merging with vertex. Pronotum highly and regularly arcuate, rugose and granulose ; median carina in profile serrated ; anterior margin of prozona not protruding forwards, prozona without transverse wrinkles between sulci ; lateral carinae rather strong. Anterior femora tuberculate. Elytra and wings completely covered by pronotum ; elytron half the length of wing, of oval form, its costal and subcostal area strongly sclerotized. Subgenital plate with angular apex.

Spermatheca, with three or four narrow, vermicular diverticula.

General coloration green or greenish ; pronotum sometimes with oblique, whitish, granulose stripes ; sclerotized part of elytron bright red ; sides of abdomen sometimes with row or three rows of whitish oblique spots.

Length of body ♂ 47–59, ♀ 48–55 ; pronotum ♂ 19–23, ♀ 26–32 ; elytron ♂ 38–44, ♀ 7–8 ; hind femur ♂ 15–16, ♀ 17–21 mm.

Variability : this species varies slightly in body size, curvature and height of pronotum, acuteness of male supra-anal plate and coloration as described above.

Material examined. 32 ♂, 4 ♀. Type ♂ nymph. Type locality : " Natal ". (British Museum (Natural History).)

Type of *Bulla longicornis* Stål 1873. 1 ♂, " Caffraria ". (Naturhistoriska Riksmuseet, Stockholm).

Natal : Pinetown ; Port Shepstone ; Pietermaritzburg ; Durban ; Uvongo Beach ; Amanzimtoti ; Stanger ; Inchanga ; Umkomaas ; Richmond. Zululand : Eshowe. Nyasaland : Road, Mlanje to Zomba. Cape Province : Port St. John. From November to May.

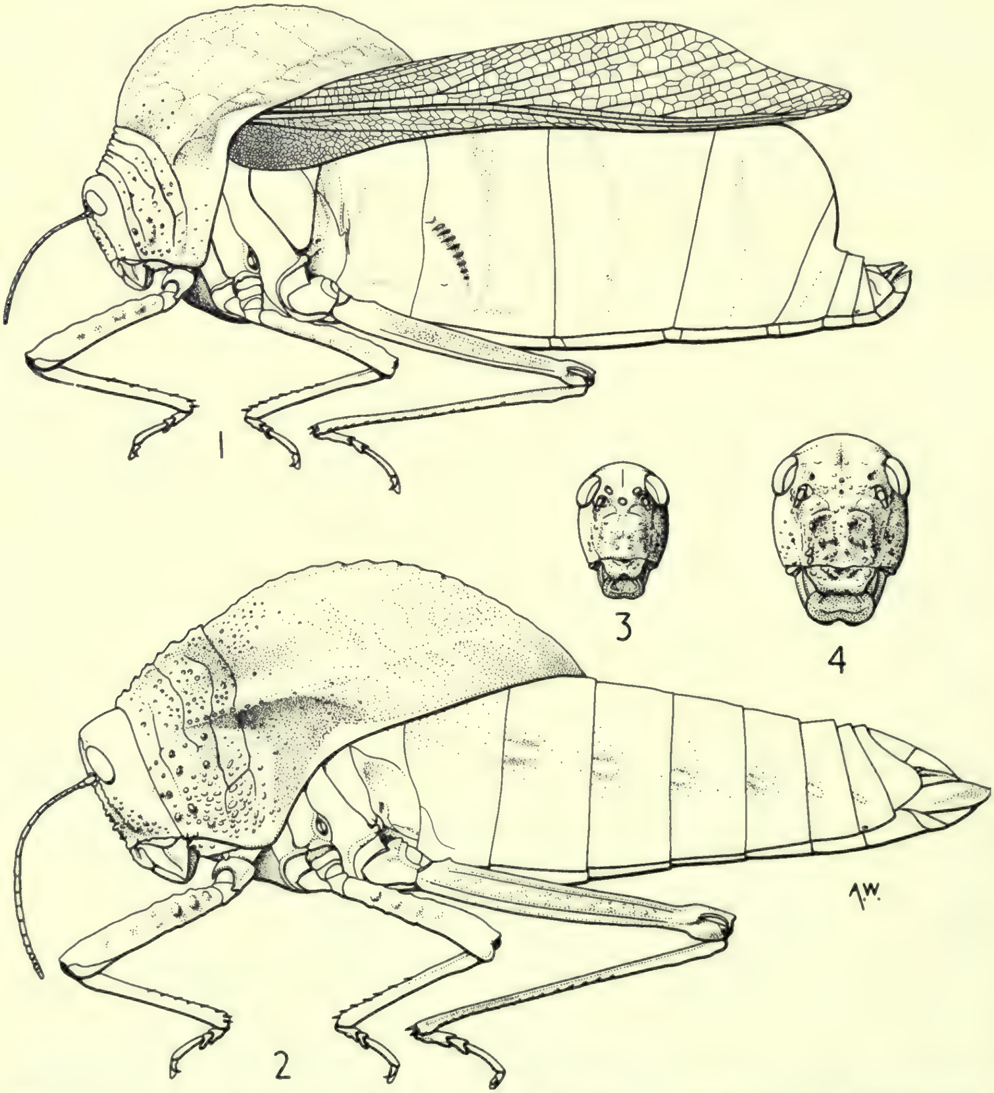

Fig. 13. *Bullacris membracioides.* 1, male. 2, female. 3, male face. 4, female face.

Bullacris discolor (Thunberg, 1810)
(Text-figs. 15, 16)

Pneumora discolor Thunberg, 1810 : 59. ♂.
Pneumora ocellata Thunberg, 1810 : 60. ♂. **syn. n.**
Pneumora pupillata Thunberg, 1810 : 60. ♂. **syn. n.**
Bulla consobrina Péringuey, 1916 : 406. ♂. **syn. n.**
Bullacris discolor (Thunberg) Johnston, 1956 : 27.

♂. Integument of head and pronotum rugose, abdomen smooth. Antenna filiform, 22–23-segmented, all, except six apical segments, elongated. Head relatively large ; frons slightly convex, gradually merging with vertex ; fastigial furrow faint. Pronotum in profile very low, regularly arcuate, with weak depression between prozona and metazona ; anterior margin of prozona angular, median carina in prozona, between sulci, with transverse wrinkles ; metazona with convex sides ; lateral carinae weak. Third abdominal tergite with 9–10 stridulatory ridges. Anterior femur with large tubercles ; hind femur short and weak ; Brunner's organ undetectable. Supra-anal plate acutely angular, moderately elongated. Subgenital plate short acutangular with obtuse apex.

Phallic complex with moderately well sclerotized lateral parts of ectophallus and with elongated dorsal valves.

General coloration green, straw-yellowish or less frequently reddish ; median carina of pronotum reddish or yellowish ; posterior margin of lateral lobe of pronotum yellowish, sides of abdomen with four or five brown spots with centres of lighter shade ; three middle spots large, marginal ones small.

♀. Integument more rugose and granulose. Antenna 23-segmented. Head large ; frons flat ; fastigial furrow well pronounced. Pronotum more tectiform than in male ; depression between prozona and metazona less pronounced than in male ; median carina in prozona, in

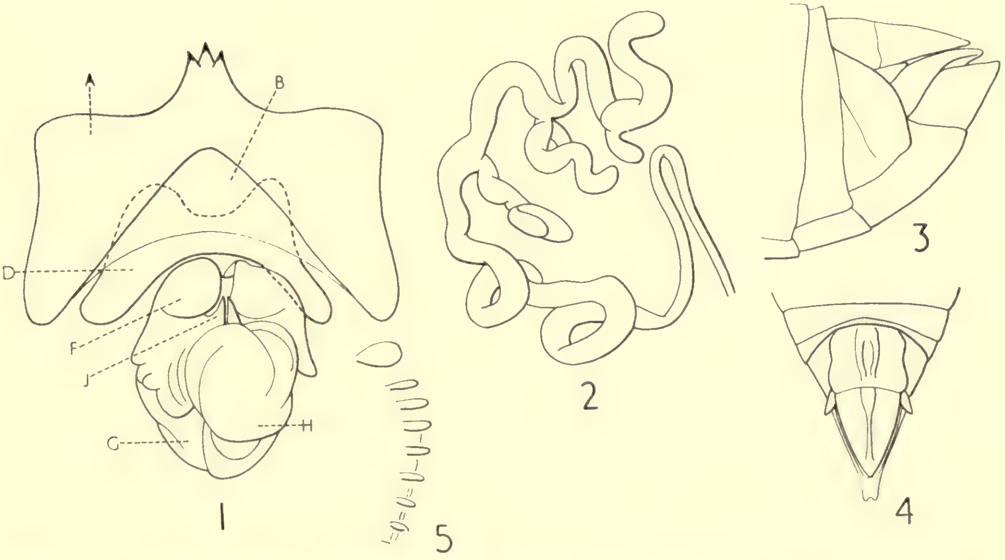

FIG. 14. *Bullacris membracioides*. 1, phallic complex, from above. 2, spermatheca. 3, end of male abdomen, lateral view. 4, the same from above. 5, abdominal stridulatory ridges (semi-schematic).

profile, slightly serrated ; lateral carinae more strongly developed than in male. Elytra and wings strongly shortened, completely covered by pronotum ; elytron half as long as wing, of oval shape, with costal area sclerotized. Subgenital plate with acutangular apex.

Spermatheca vermicular, with three or four vermicular diverticula.

General coloration green or olive-green ; posterior margin of lateral lobe of pronotum and merging part of margin of metazona yellowish ; sclerotized part of elytron bright red.

Length of body ♂ 44–58, ♀ 43–51 ; pronotum ♂ 21–24, ♀ 25–29 ; elytron ♂ 37–45, ♀ 8 ; hind femur ♂ 14–15, ♀ 15–18 mm.

Variability : This species varies in body size, shape of pronotum, which in profile varies in height of arc ; number of stridulatory ridges in males (9 or 10) ; and supra-anal plate which may be elongated and acute or less elongated. Coloration varies from green or yellowish to red ; pronotum in both sexes uniformly coloured or with whitish, oblique stripes ; elytra

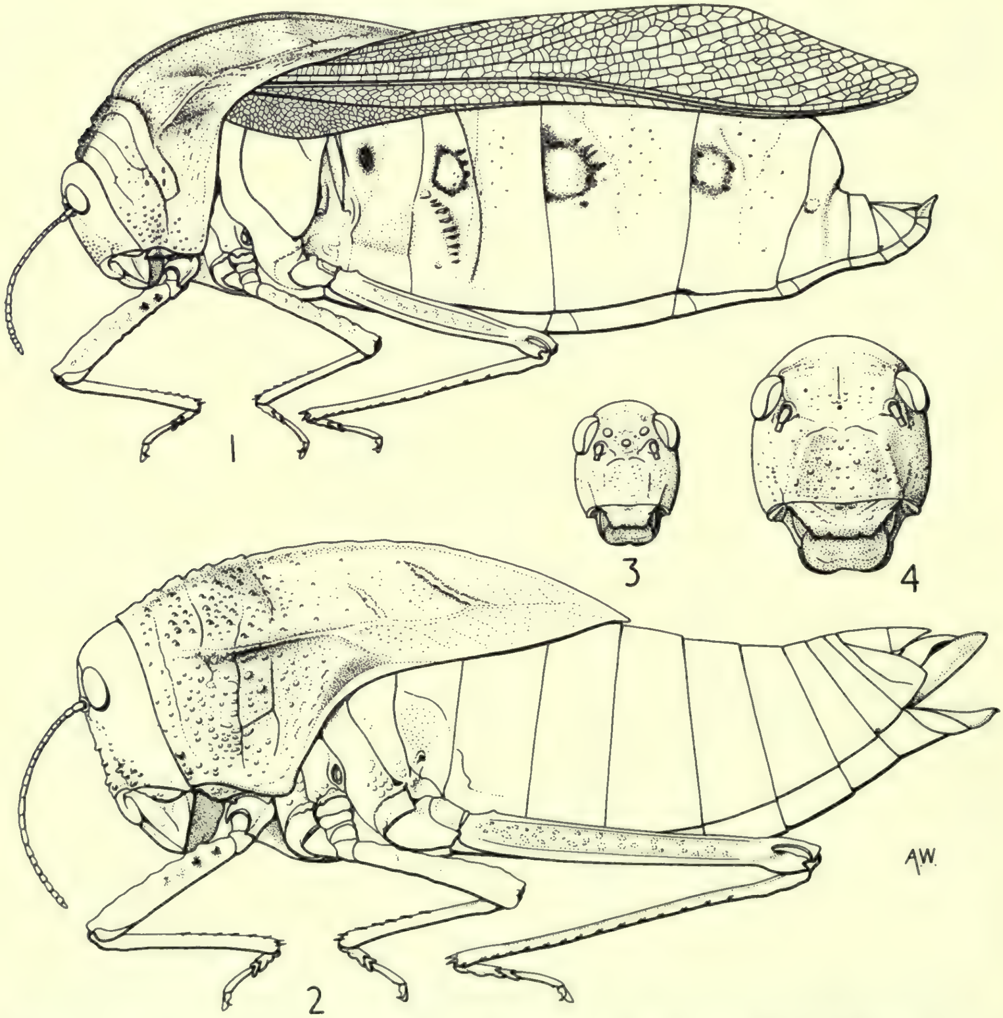

Fig. 15. *Bullacris discolor*. 1, male. 2, female. 3, male face. 4, female face.

mostly uniformly coloured, but sometimes basal part brownish, owing to brown venation and reticulation, sometimes whole elytra sparsely covered with small brown dots ; spots on sides of abdomen in males vary in size and in size of their lightish central area, spots sometimes entirely lacking ; in females, spots whitish and sometimes obliterated.

Material examined. 26 ♂, 6 ♀. Type ♂. Type locality : " South Africa ". (Zoologiska Institutionen, Uppsala University.)

None of Thunberg's types mentioned in synonymy bear locality labels.

CAPE PROVINCE : Pearly Beach ; Alice, Nutwoods ; Knysna ; Swellendam ; Somerset West ; Port Elizabeth ; Kalk Bay ; Lemoens Hoek, Heidelberg ; Noordhoek ; East London ; Cape Town, Kirstenbosch ; Stellenbosch ; Zoetendals Valley, Bredasdorp Dst. From October to January.

Bullacris serrata (Thunberg, 1810)
(Text-figs. 17, 18)

Pneumora serrata Thunberg 1810 : 64. ♀.
Bullacris serrata (Thunberg) Johnston, 1956 : 30.

♂. Integument of head and pronotum rugose, abdomen smooth. Antenna filiform, 23-segmented. Head relatively large ; frons slightly convex, roundly merging with vertex ; fastigial furrow faint. Pronotum in profile low and regularly arcuate ; between prozona and metazona on sides of median carina there are moderately deep depressions ; median carina rather sharp, in prozona in profile roughly serrated ; lateral carinae well pronounced in anterior part of metazona ; dorsum of metazona on sides of median carina slightly depressed. Third abdominal tergite with ten stridulatory ridges. Anterior femur tuberculate ; hind femur weak ; Brunner's organ not detectable. Supra-anal plate narrow acutangular ; subgenital plate short, acutangular, at apex shallowly incised.

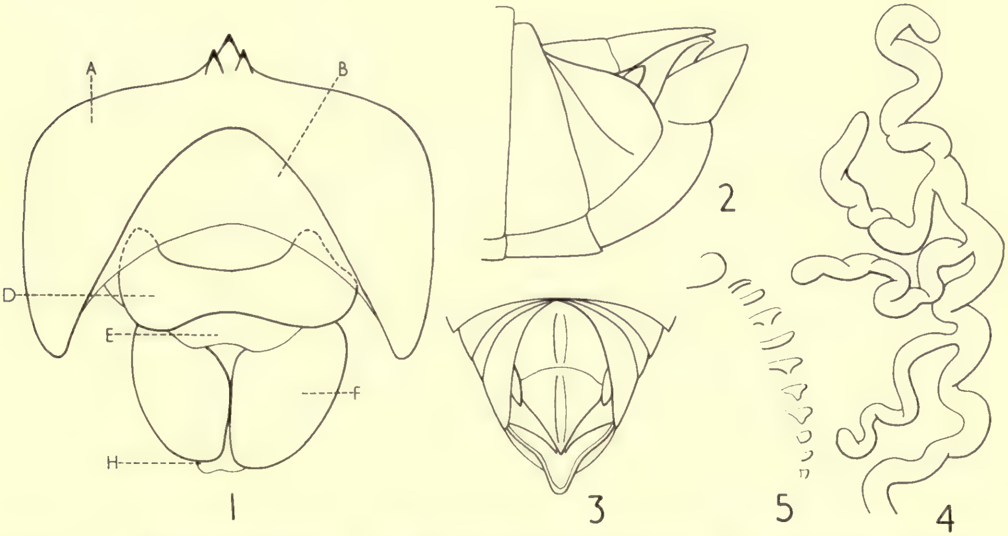

FIG. 16. *Bullacris discolor*. 1, phallic complex, from above. 2, end of male abdomen, lateral view. 3, the same, from above. 4, spermatheca. 5, abdominal stridulatory ridges (semi-schematic).

Phallic complex with weakly sclerotized lateral parts.

General coloration green, olive-green ; pronotum covered with small, whitish spots ; membrane and main veins of elytra light olive green, veinlets of reticulation dark olive-green ; reticulation of wing also much darker than membrane ; sides of abdomen with four brown and white spots and second to seventh tergites each with several whitish spots.

♀. Integument of head and pronotum rugose, of abdomen moderately smooth. Antenna filiform, 23-segmented. Head large ; frons almost flat, roundly merging with vertex ; fastigial furrow faint. Pronotum in profile very low arcuate ; depressions between prozona and metazona hardly exist. Median carina rather sharp, in prozona in profile slightly serrated ; lateral carinae well pronounced in prozona and metazona ; metazona at sides of median carina

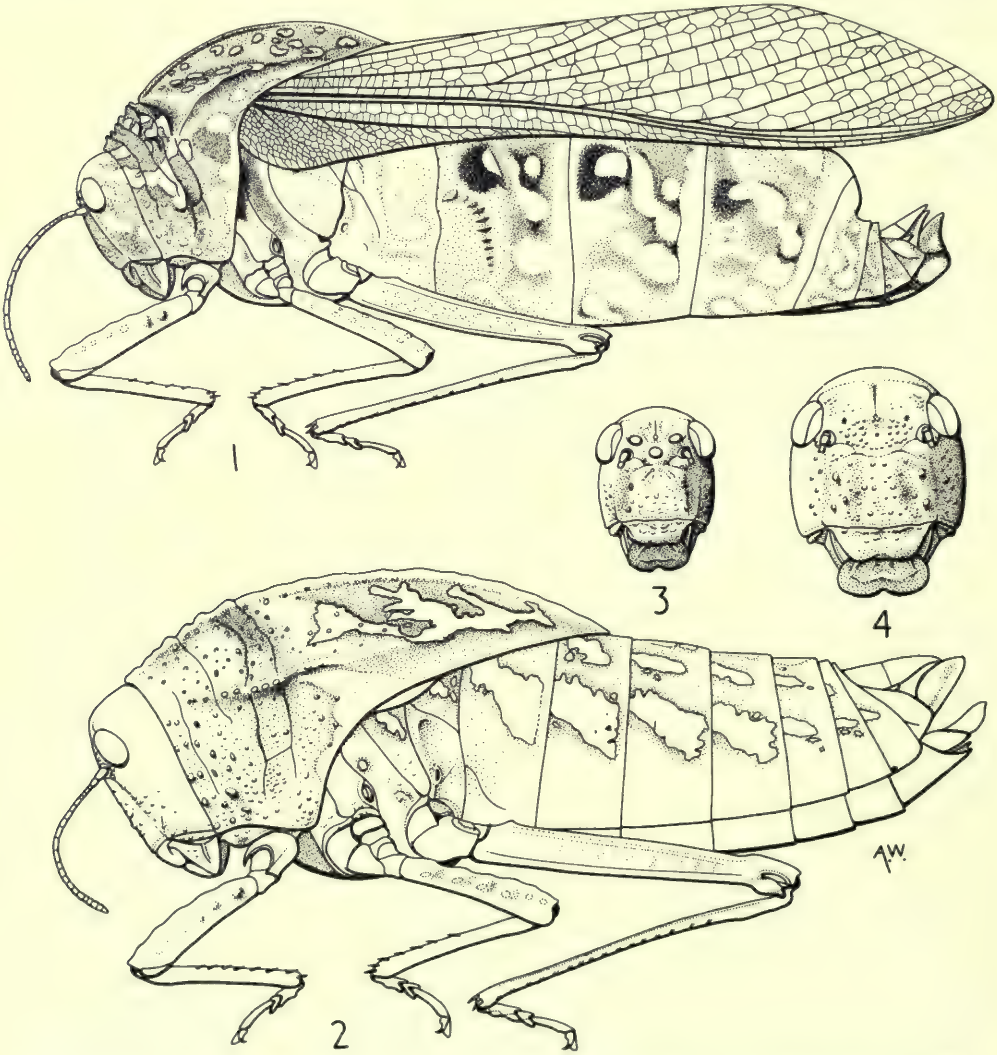

Fig. 17. *Bullacris serrata.* 1, male. 2, female. 3, male face. 4, female face.

convex. Elytra and wings strongly reduced and covered by pronotum ; elytron of oval shape, slightly more than half of length of wing, its costal area sclerotized. Anterior femur strongly tuberculate and toothed ; middle femur tuberculate ; hind femur weak ; Brunner's organ undetectable. Subgenital plate with angular apex.

Spermatheca vermicular, with several vermicular diverticula.

General coloration olive-green ; median and lateral carinae of pronotum yellowish, sides of dorsum of pronotum with three to five whitish oblique stripes of callosities ; sclerotized part of elytron bright red ; tergites on each side of abdomen with whitish oblique spots forming four parallel rows ; a similar row of spots in upper part of sternites.

Length of body ♂ 49–53, ♀ 45–55 ; pronotum ♂ 18–20, ♀ 24–27 ; elytron ♂ 38–47, ♀ 9 ; hind femur ♂ 14–15, ♀ 15–18 mm.

Variability : This species varies in body size, height of arc of pronotum, degree of depression between prozona and metazona, and in degree of the rugosity of pronotum ; pattern on pronotum may be covered with callosities forming whitish stripes disintegrated into spots or almost disappearing completely ; intensity of the pattern on sides of abdomen in both sexes also variable and in females may almost disappear.

This species is very near to *Bullacris discolor* Thunberg, 1810. It differs in the pattern of the pronotum and of the sides of abdomen, and also in the dark coloured reticulation of the elytron. It is possible that it represents a local race of *discolor*, but the material is so scanty that temporarily it is advisable to regard it as a separate species.

Material examined. 10 ♂, 2 ♀. Type ♀. Type locality : " South Africa ". (Zoologiska Institutionen, Uppsala University.)

CAPE PROVINCE : East London ; Carl's Rust ; Swartberg Pass, Great Karroo ; Knysna ; Grahamstown. November–December.

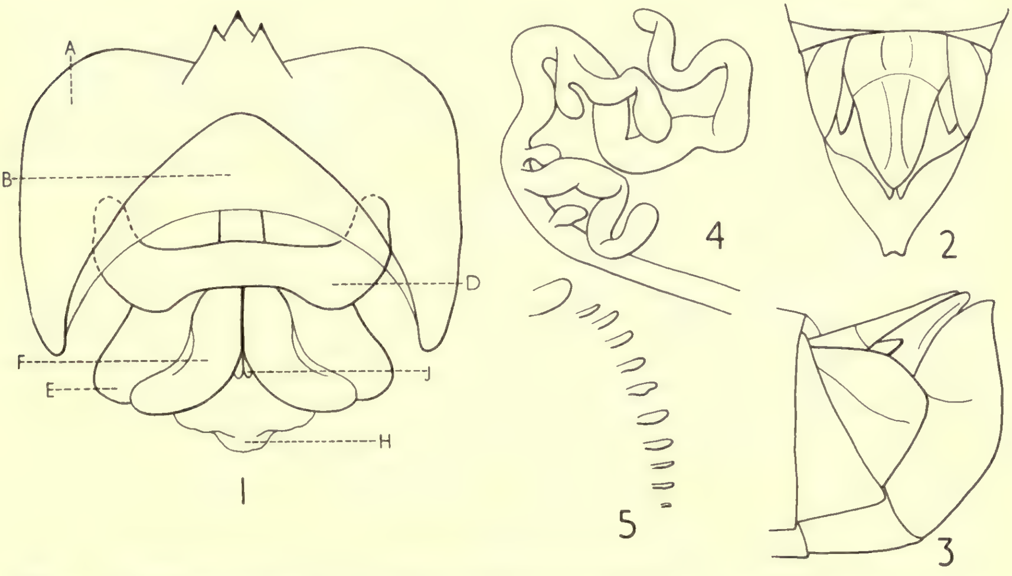

FIG. 18. *Bullacris serrata*. 1, phallic complex, from above. 2, end of male abdomen, from above. 3, the same, lateral view. 4, spermatheca. 5, abdominal stridulatory ridges (semi-schematic).

Bullacris obliqua (Thunberg, 1810)
(Text-figs. 19, 20)

Pneumora obliqua Thunberg, 1810 : 65. ♀.
Pneumora papillosa Thunberg, 1810 : 61. ♂. [nec *Gryllus papillosus* Fabricius 1775]. **syn. n.**
Bulla thunbergii Kirby, 1910 : 63. [n. n.]. **syn. n.**
Bullacris thunbergii (Kirby) Rehn, 1941 : 152.

♂. Integument of head and pronotum moderately rugose and granulose, abdomen smooth. Antenna filiform, 21-segmented. Head of medium size ; frons slightly convex, roundly merging with vertex. Pronotum in profile low arcuate ; between prozona and metazona with lateral depressions ; median carina in prozona lowered, and in profile roughly serrated ; anterior margin of prozona angular ; sides of metazona convex ; lateral carinae weak.

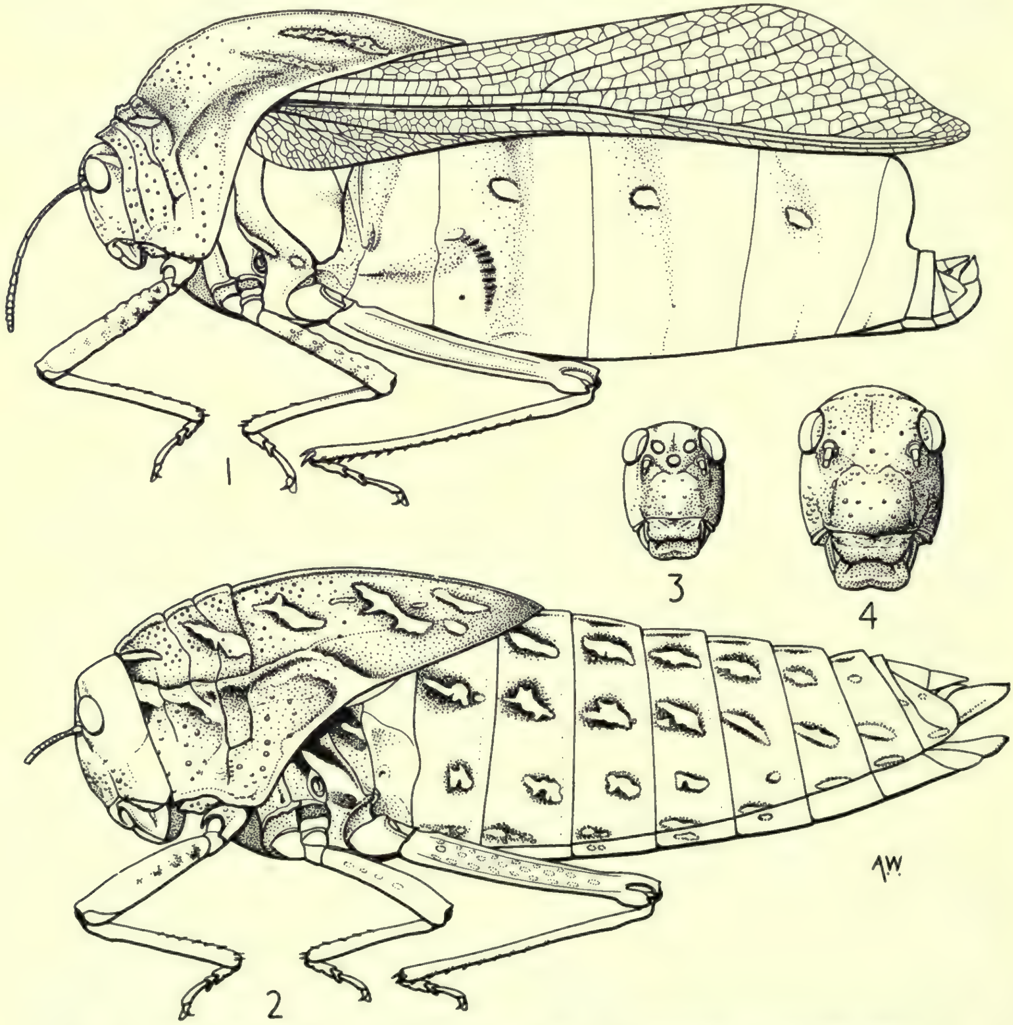

FIG. 19. *Bullacris obliqua*. 1, male. 2, female. 3, male face. 4, female face.

Third abdominal tergite with 13 stridulatory ridges. Anterior femur tuberculate ; middle femur slightly tuberculate ; hind femur weak ; Brunner's organ vestigial, hardly detectable. Supra-anal plate elongate, narrow angular ; subgenital plate short, angular, with apex excised.

Phallic complex with small inflated lateral valves and weakly sclerotized lateral parts.

General coloration green or greenish ; pronotum with two or three oblique, lateral, white stripes ; posterior margin of lateral lobe of pronotum with whitish stripe ; median carina reddish ; sides of abdomen with three or four white spots with narrow brown margins.

♀. Integument of head and pronotum rugose and granulose, abdomen smooth. Antenna filiform, 23-segmented. Head relatively large ; frons almost flat, angularly merging with vertex. Pronotum in profile moderately low arcuate, regular in shape, rather high tectiform ; between prozona and metazona shallow lateral depressions ; median carina rather sharp, in prozona in profile slightly incised at transverse sulci ; anterior margin of prozona slightly angular ; sides of metazona convex ; lateral carinae strong. Elytra and wings strongly shortened almost completely covered by pronotum ; elytron of oval shape, slightly more than half length of wing, its costal area strongly sclerotized. Anterior femur moderately tuberculate ; middle femur almost smooth, hind femur weak ; Brunner's organ not detectable. Subgenital plate with obtusangular apex.

General coloration greenish ; pronotum with four or five oblique, whitish lateral stripes ; median carina of pronotum reddish ; sclerotized part of elytron bright red ; sides of abdomen with four rows of whitish spots.

Length of body ♂ 41–46, ♀ 45–51 ; pronotum ♂ 16–18, ♀ 22–24 ; elytron ♂ 32–37, ♀ 7; hind femur ♂ 13–14, ♀ 14–15 mm.

Variability : Too few specimens of this species are known to judge its variability. However, even in a few specimens, in both sexes, it was observed that the pronotum varies slightly in the shape of the arcuate part. The general coloration varies in its intensity; the described pattern may be strongly developed, with large well defined spots or the spots may be reduced in size and intensity ; this is particularly noticeable on the pronotum and the sides of the abdomen.

This species is very near to *Bullacris discolor* Thunb. and *Bullacris serrata* Thunb. Possibly they are local races of the same species. Unfortunately the available material is too small to reach a definite conclusion.

Material examined. 3 ♂, 4 ♀. Type ♀. Type locality : " South Africa ". (Zoologiska Institutionen, Uppsala University.)

Cape Province : Saldanha Bay ; Wallekraal ; Tygerberg Hills ; Eland's Bay, Leipoldtville. October.

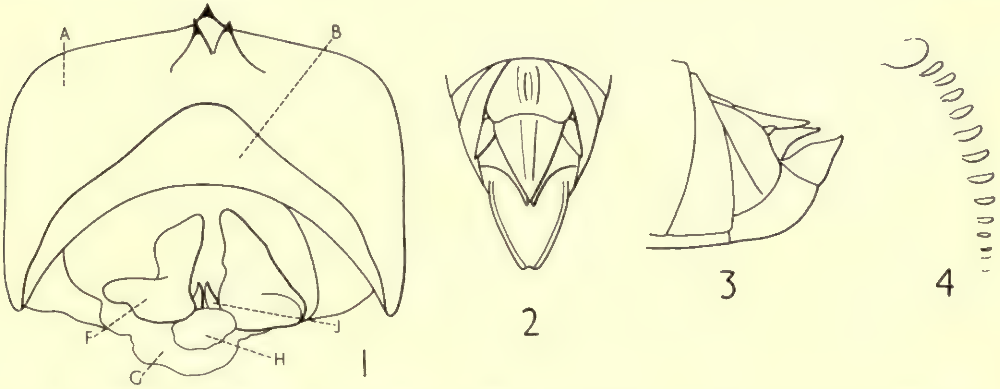

FIG. 20. *Bullacris obliqua*. 1, phallic complex, from above. 2, end of male abdomen, from above. 3, the same, lateral view. 4, abdominal stridulatory ridges (semi-schematic).

Bullacris boschimana (Péringuey, 1916)
(Text-fig. 21)

Cystocoelia boschimana Péringuey, 1916 : 411. ♀.
Bullacris boschimana (Péringuey) Johnston, 1956 : 27.

♀. Integument of head and pronotum strongly granulose, with three callosities on pronotum ; abdomen smooth. Antenna filiform, 23-segmented. Head moderately large, frons slightly convex, angularly merging with vertex. Pronotum tectiform, in profile almost non-arcuate, crossed by four sulci ; anterior margin of prozona angular ; median carina slightly raised towards posterior sulcus and roughly serrated in prozona, in middle of metazona slightly lowered ; a pair of lateral depressions on sides of median carina, at posterior sulcus well pronounced ; in anterior part of metazona a pair of shallow lateral depressions on sides of median carina present as well ; lateral carinae marked by row of granules. Elytra strongly shortened, not reaching second abdominal tergite, with sclerotized costal area and coarse reticulation, protruding from under lateral margin of metazona of pronotum. Anterior and middle femora slightly tuberculate ; hind femur weak. Subgenital plate with acutangular apex.

General coloration pale brownish ; callosities of pronotum form three pairs of irregular, oblique, white spots ; posterior margin of lateral lobe of pronotum and adjoining part of lateral margin of metazona white ; costal area of elytron, protruding from under pronotum, pinkish ; sclerotized reticulation dark brown, shiny ; second episternum whitish ; sides of abdomen with two rows of large sharply defined whitish spots on second to fifth tergites ; on dorsal part of abdomen every tergite also with small whitish spot.

Only female known.

Length of body 54 ; pronotum 25 ; elytron (visible part) 6 ; hind femur 14 mm.

This species, known by the female type only, is rather remote from the other known species of the genus. By the low, almost non-arcuate pronotum and the peculiar pattern of the integument it resembles slightly the genus *Pneumora* ; however, the position of the ocelli is quite characteristic of the *Bullacris* group of genera. It was not possible to study the spermatheca, since no other specimen except the type is available. Further study of this species, particularly of a male, may establish its true position.

Material examined : CAPE PROVINCE : Bushmanland, Henkries, 1 ♀ type. (South African Museum.)

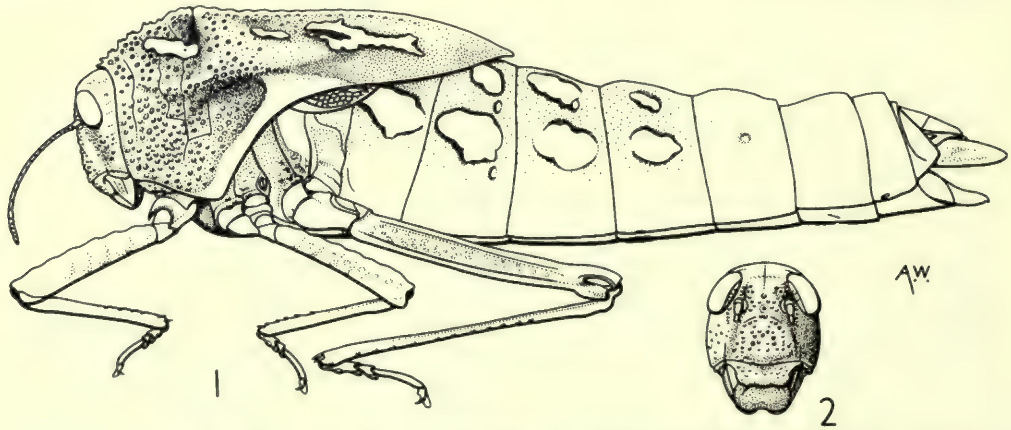

FIG. 21. *Bullacris boschimana*. 1, female (type). 2, face.

PHYSEMACRIS Roberts, 1941

Gryllus (*Bulla*) Linnaeus, 1758 : 427.
Pneumora Stål, 1873 : 143. (nec Thunberg, 1775).
Physemacris Roberts, 1941 : 12, 19 [n. n.].

Body of male down to seventh abdominal segment strongly inflated, bladder-like ; end of abdomen of normal cylindrical shape. In female, body normal, slightly compressed. Antenna filiform almost throughout length, slightly widening towards apex. Face slightly convex. Lateral ocelli placed above and slightly internally to antennal bases ; in male all three ocelli very large, in female vestigial. Compound eyes comparatively small. Pronotum crossed by four transverse sulci ; prozona much shorter than metazona, in middle with strong teeth or with teeth and tubercles ; at posterior transverse sulcus, prozona separated from metazona by a rather deep constriction on sides of median carina ; metazona elongated, low arcuate, with sides convex, covered with oblique callosities ; median carina rather sharp. Mesosternal interspace deeply concave. Male macropterous ; anterior vein of elytra unbranched. Female elytra and wings strongly shortened, covered by pronotum ; elytra sometimes slightly protruding from under lateral margins of metazona ; anterior two-thirds of elytron strongly sclerotized; wings, almost twice as long as elytron, weak, longitudinally folded, once only, along vannal fold and completely hidden under pronotum. Third abdominal tergite of male with crescent-like row of stridulatory ridges. Anterior and middle femora tuberculate ; hind femur weak, short, almost cursorial ; in male, internal side of hind femur with short high carina, bearing row of sharp transverse ridges, forming second part of stridulatory mechanism ; Brunner's organ not detectable. Arolium large. Supra-anal plate, in both sexes, simple, angular, with transverse sulcus ; cerci short, conical in both sexes ; subgenital plate in male short, acutely conical, with apex excised ; in female with angular apex. Ovipositor moderately short, with straight valves ; lower valves slightly curved at apices.

Phallic complex membranous, lateral parts of ectophallus slightly sclerotized ; dorsal part consisting of a pair of lateral inflated valves ; ventro-posterior part sac-like, membranous ; between these two parts the opening of endophallus is located. Epiphallus short and wide, with long lateral plates and three strong median, apical teeth.

Spermatheca with several narrow vermicular, irregularly twisted diverticula.

Type species : *Gryllus Bulla variolosus* Linnaeus, 1758.

Key to Species

1 (2) Vertex, above compound eyes, with a pair of small tubercles. Third abdominal tergite of male with 12–14 stridulatory ridges. Median carina of pronotum in prozona forming 3–4 large teeth. Tessellated pattern of male elytron strong **variolosus** (Linnaeus)

2 (1) Vertex, above compound eyes, with a pair of large pyramidal tubercles. Third abdominal tergite of male with 8 stridulatory ridges. Median carina of pronotum in prozona forming a large tubercle-like projection and two small teeth. Tessellated pattern of male elytron weak . . . . **papillosus** (Fabricius)

Physemacris variolosus (Linnaeus, 1758)
(Text-figs. 22, 23)

Gryllus Bulla variolosus Linnaeus, 1758 : 427. ♂.
Pneumora maculata Thunberg, 1775 : 257. ♂. **syn. n.**
Pneumora marmorata Thunberg, 1810 : 63. ♂ [Syn. Stål, 1873 : 143].
Pneumora spinulosa Thunberg, 1810 : 64. ♀. **syn. n.**
Physemacris variolosus (Linnaeus) Roberts, 1941 : 19.

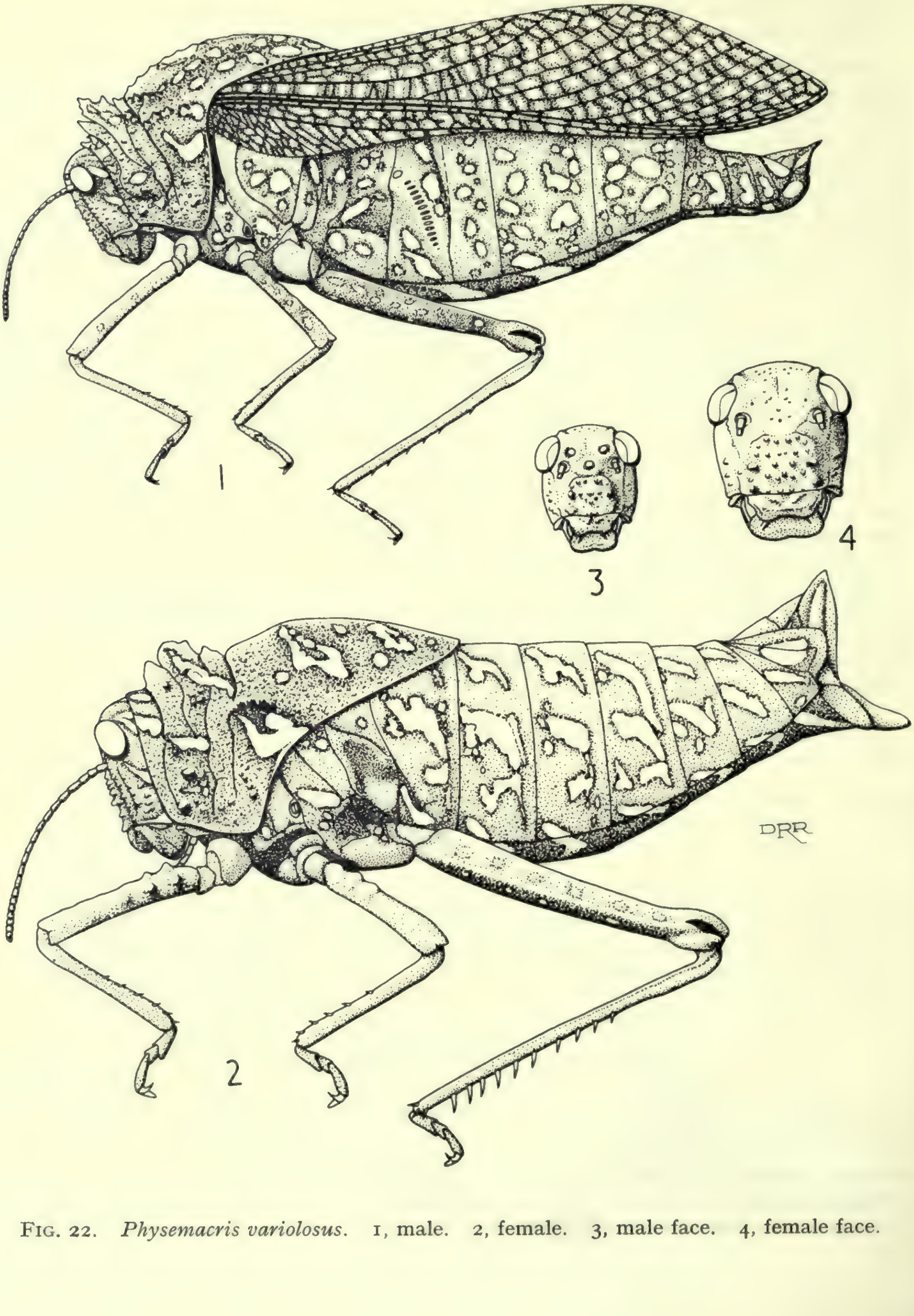

FIG. 22. *Physemacris variolosus*. 1, male. 2, female. 3, male face. 4, female face.

♂. Of medium size. Integument of head and pronotum rugose and granulose. Antenna 23-segmented, longer than face, but much shorter than head and pronotum together. Frons roundly merging with vertex, above compound eyes with a pair of small tubercles. Median carina of pronotum in prozona forming three or four large teeth, which are sometimes fused, and one or two smaller teeth ; a few smaller lateral teeth scattered on lateral lobes ; metazona low arcuate, with median carina low, sharp and lateral carinae irregular, wrinkle-like, present in anterior part ; lower margin of lateral lobe of pronotum sinuate, episternum comparatively large, with smooth edges. Elytra and wings reaching or slightly exceeding end of abdomen. Third abdominal tergite with 12–14 stridulatory ridges.

General coloration green to olive-green ; head and pronotum with numerous small, white or whitish spots of irregular form sometimes fused into oblique, longitudinal patches on dorsum of pronotum ; elytra green, with white tessellated pattern ; sides of abdomen with numerous white or whitish spots.

♀. Large. Integument rugose and granulose. Antenna 22-segmented, about as long as face. Frons roundly merging with vertex, above compound eyes with a pair of small tubercles. Median carina of pronotum in prozona forming two or three large teeth, which are sometimes fused, and a few smaller teeth ; several smaller teeth scattered on dorsum and lateral lobes ; metazona low arcuate, with low, sharp median carina ; lateral carinae irregular, callous and tuberculate, present in anterior part of metazona and partly in posterior part of prozona ; lower margin of lateral lobe of pronotum sinuate ; episternum with tooth on upper part of anterior margin. Elytra and wings hidden under pronotum ; elytron sometimes slightly protruding from under lateral margin of metazona.

General coloration light green ; whole body covered with small silvery-white spots of irregular form ; on pronotum spots sometimes fused into elongate, oblique patches ; on sides of abdomen spots form two or three regular longitudinal rows, with smaller spots scattered between them ; ventral side with two rows of similar spots. Protruding part of elytron bright red.

Length of body ♂ 39–51, ♀ 40–50 ; pronotum ♂ 15–17, ♀ 18–20 ; elytron ♂ 31–42, ♀ about 6 ; hind femur ♂ 13·6–16, ♀ 16–17·5 mm.

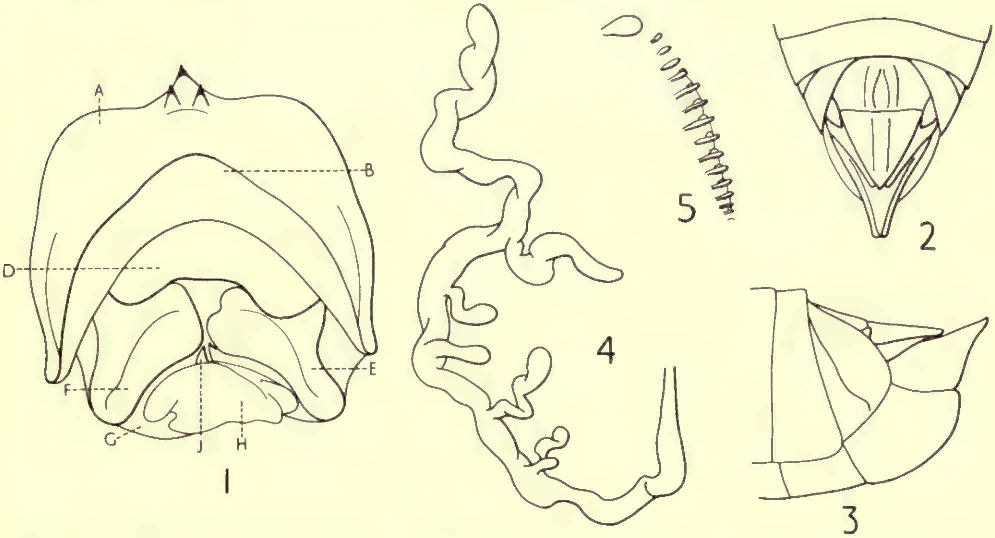

FIG. 23. *Physemacris variolosus*. 1, phallic complex, from above. 2, end of male abdomen, from above. 3, the same, lateral view. 4, spermatheca. 5, abdominal stridulatory ridges (semi-schematic).

This species varies very much in body size and in shape and sculpture of the pronotum, which bears three and sometimes four teeth, while sometimes the teeth are fused or partly obliterated. The pattern on the pronotum and the whole body also varies very much, sometimes there are small white spots forming an indefinite pattern and sometimes the spots are fused into patches forming oblique stripes.

Material examined. 43 ♂, 13 ♀. Type ♂. Type locality " In Indiis " (erroneous). (Lovisa Ulrika Collection in Uppsala.)

CAPE PROVINCE : Cape Town, Kirstenbosch ; De Wet ; Moshameer ; Cape Peninsula ; Garcias Forestry ; Still Bay ; Worcester ; Fishhoek ; Swartberg Pass ; East London ; Swellendam ; Montagu ; Stellenbosch ; Riversdale ; Hermanus ; Willowmore ; Stanford ; Seven Weeks Port ; Jonkersberg ; Knysna ; Jeffreys Bay ; Oudtschoorn ; Tradow Pass ; Somerset West ; Arniston ; Zoetendals Vallei. October–January.

Physemacris papillosus (Fabricius, 1775)
(Text-fig. 24)

Gryllus papillosus Fabricius, 1775 : 827. ♂ [nec Thunberg, 1810 : 61].
Physemacris papillosus (Fabricius) Johnston, 1956 : 32.

♂. Of medium size. Integument of head and pronotum moderately rugose (antennae broken). Frons roundly merging with vertex, above compound eyes with a pair of large, pyramidal tubercles. Median carina of pronotum in prozona forming large fold projecting upwards ; posteriorly to projection are two small teeth ; metazona low arcuate, with sharp, moderately high median carina ; lateral carinae strong, covered with callosities, strongly

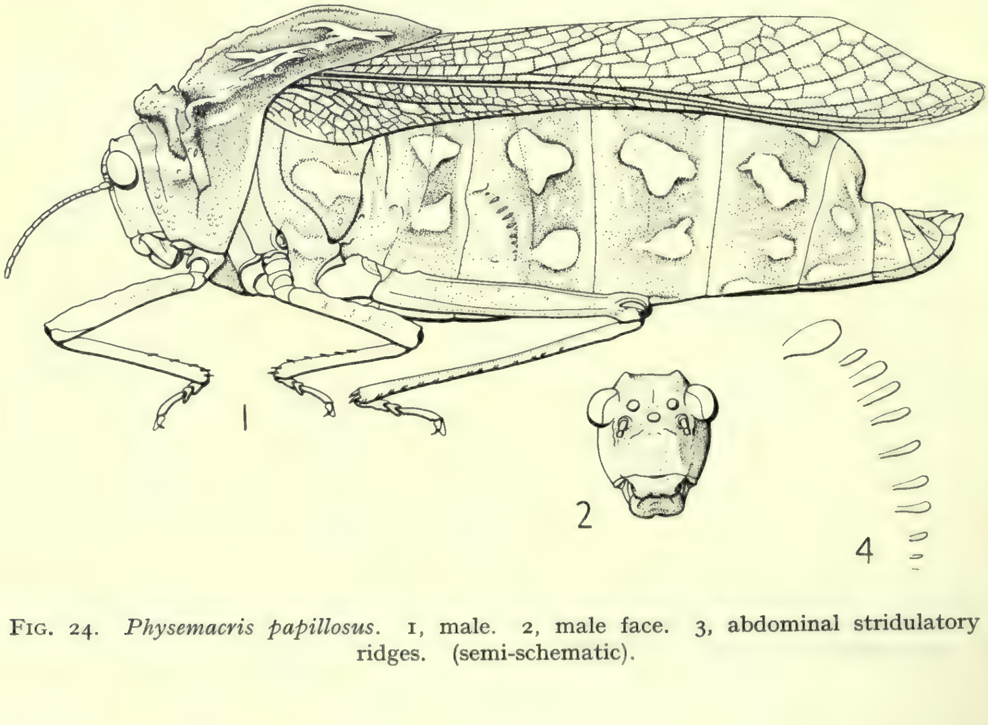

FIG. 24. *Physemacris papillosus.* 1, male. 2, male face. 3, abdominal stridulatory ridges. (semi-schematic).

protruding forwards and upwards, forming large "shoulders"; lower margin of lateral lobe sinuate; episternum with small tooth on anterior margin. Elytra and wings slightly exceeding end of abdomen. Third abdominal tergite with eight stridulatory ridges.

General coloration greenish; dorsum of pronotum with oblique, irregular, branched white spots; elytra greenish, with green venation and reticulation and weak tessellated pattern; side of abdomen with three longitudinal rows of irregular, large spots; ventral side of abdomen with two rows of white spots.

Female unknown.

Length of body 42; pronotum 15·5; elytron 34·6; hind femur 13 mm.

Material examined. Type ♂. Type locality; Cape of Good Hope. (Banks Collection, British Museum (Natural History).)

CAPE PROVINCE: Uniondale, 1 ♂; Rusten Vrede, Oudtshoorn Distr., 1 ♂ nymph.

PERINGUEYACRIS gen. n.

Small; anterior part of body of male, to seventh abdominal segment, bladder-like, inflated; end of abdomen of normal cylindrical shape. Antenna filiform, slightly widening at apical part. Face slightly convex; frons roundly merging with vertex. Lateral ocelli placed above and slightly internally to antennal bases; in male all three ocelli very large; compound eyes small, oval, strongly convex. Pronotum low arcuate, crossed by four transverse sulci; prozona much shorter than metazona; at posterior sulcus there are deep lateral depressions; median carina of prozona low, tubercle-like, widening in posterior part, in metazona sharp and slightly serrated; posterior margin of metazona elongate angular; episternum granulose, with small projection on anterior margin. Mesosternal interspace deeply concave. Male macropterous; anterior cubital vein of elytron unbranched. Third abdominal tergite of male with long row of fine stridulatory ridges. Anterior and middle femora slightly tuberculate; hind femur weak, moderately short; in male, internal side of hind femur with short high carina, bearing row of small transverse ridges, forming second part of stridulatory mechanism. Brunner's organ hardly detectable. Arolium large. Supra-anal plate of male elongate angular, with transverse sulcus. Cercus short, conical. Subgenital plate short, acutely conical.

Phallic complex. Ectophallus membranous; lateral valves weakly sclerotized, posterior sac-like formation large. Endophallus banana-shaped, with a pair of weak lateral sclerotizations. Epiphallus with large medium and pair of smaller lateral, apical teeth; lateral plates comparatively wide.

Type species: *Pneumora namaqua* Péringuey, 1916.

Peringueyacris namaqua (Péringuey, 1916) **comb. n.**
(Text-fig. 25)

Pneumora namaqua Péringuey, 1916: 410. ♂.
Physemacris namaqua (Péringuey) Johnston, 1956: 32.

♂. Small. Integument of head and pronotum rugose and granulose and slightly hairy. Antenna 22-segmented, slightly longer than face and much shorter than head and pronotum together. Prozona of pronotum with convex folds between sulci; lateral carinae of pronotum weak, noticeable in posterior part of prozona and anterior part of metazona as granulated wrinkles; lower margin of lateral lobes slightly sinuate. Male elytra reach well beyond end of abdomen. Third abdominal tergite of male with 28–30 fine stridulatory ridges.

General coloration green; pronotum with two or three pairs of white, longitudinal, oblique patches; elytra greenish, with yellowish main veins; sides of abdomen with two rows of white spots, which are sometimes obliterated; ventral part of abdomen sometimes also with two rows of whitish spots.

♀. Unknown.
Length of body 25–26 ; pronotum 12·4–12·5 ; elytron 25–26 ; hind femur 10–11 mm.

Material examined. Type ♂. Type locality : Springbok Fontein. (South African Museum.)

Cape Province : Nababiep, 1 ♂ ; Springbok, 1 ♂. August, October.

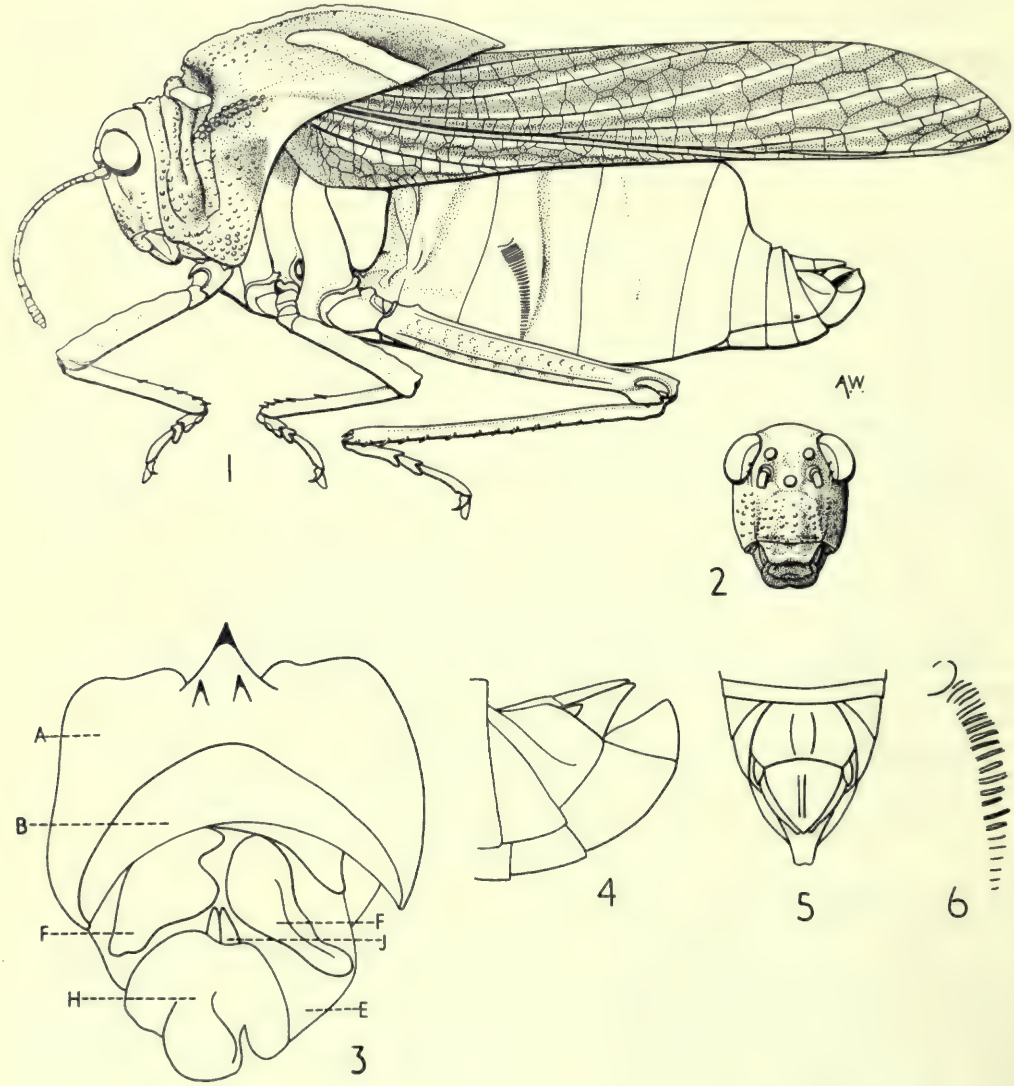

Fig. 25. *Peringueyacris namaqua*. 1, male. 2, male face. 3, phallic complex, from above. 4, end of male abdomen, lateral view. 5, the same, from above. 6, abdominal stridulatory ridges (semi-schematic).

PROSTALIA I. Bolivar, 1906

Pompholyx Stål, 1873 : 144, [nec Gosse, 1851].
Prostalia I. Bolivar, 1906 : 396 [n. n.].

Anterior part of body in male, to sixth segment, strongly inflated, bladder-like ; end of abdomen of usual cylindrical shape. In female, body of normal shape, slightly compressed. Antenna thin, filiform, much shorter than pronotum. Face slightly convex. Lateral ocelli placed slightly above and internally to antennal bases ; in male all three ocelli large, in female smaller. Compound eyes, in both sexes, small, oval, strongly convex. Pronotum low arcuate, crossed by four transverse sulci ; median carina sharp and deeply serrated, particularly in prozona ; lateral carinae sharp, tuberculate ; metazona three or four times as long as prozona, its posterior margin elongate angular. Episternum with angular, tooth-like anterior end. Male fully winged ; anterior cubital vein of elytron unbranched ; reticulation sparse. Female brachypterous, elytra reaching end of pronotum and protruding from under sides of metazona ; venation reduced, reticulation moderately sparse. Third abdominal tergite of male with a row of transverse stridulatory ridges. Anterior and middle femora moderately slender, slightly tuberculate ; hind femur comparatively short and weak, on internal side with short high carina, bearing a row of transverse ridges, which form second part of stridulatory mechanism ; in female, on internal side of hind femur there is a longer row of small teeth but not ridges on abdomen. Brunner's organ absent. Lower lobe of hind knee narrow with subacute apex, in basal part of lower margin with large, acute tooth. Arolium large. Supra-anal plate, in both sexes, elongate angular. Cerci short, conical. Subgenital plate of male short, acutely conical, in female with acutangular apex ; ovipositor short, robust, with straight valves.

Phallic complex. Almost wholly membranous ; lateral and proximal dorsal parts of ectophallus slightly sclerotized ; dorsal part with pair of lateral, inflated valves ; ventro-posterior part sac-like, membranous ; opening of endophallus located between valves and sac-like part ; endophallus with a pair of lateral, narrow, longitudinal sclerotizations. Epiphallus approximately bridge-shaped, with elongated posterior projections and, in anterior projecting part, with numerous small teeth.

Type species : *Pneumora granulata* Stål, 1873.

Prostalia granulata (Stål, 1873)
(Text-figs. 26, 27)

Pneumora granulata Stål, 1873 : 53. ♂.
Pompholyx granulata (Stål) I. Bolivar, 1906 : 396.
Prostalia granulata (Stål) I. Bolivar, 1906 : 341.
Bulla subalata Péringuey, 1916 : 409. ♀. [Syn. Uvarov, 1928.]

♂. Large ; body strongly inflated. Integument of head and pronotum strongly granulose and rugose, abdomen smooth. Antenna slightly longer than face, 21-segmented. Frons roundly merging with short vertex. Crest of pronotum low ; median carina sharp throughout length, in prozona more strongly serrated than in metazona ; all four sulci deep, across whole width of dorsum ; lower margin of lateral lobe of pronotum sinuate. Elytra and wing exceeding end of abdomen. Third abdominal tergite with 15 stridulatory ridges. Stridulatory ridges on internal side of hind femur forming a rather short row.

General coloration green ; elytra and wings transparent, venation and reticulation light green.

♀. Large. Integument of head and pronotum strongly granulose and rugulose, abdomen smooth. (Antennae broken.) Frons roundly merging with moderately short vertex. Crest of pronotum low ; median carina sharp throughout length, in prozona much more strongly serrated than in metazona ; all four sulci deeply crossing dorsum and carina ; lower margin of lateral lobe of pronotum slightly sinuate. Elytra and wings strongly shortened and scarcely reaching end of pronotum, but roundly and considerably protruding from under lateral margins of metazona. Internal side of hind femur with moderately long row of small teeth, which probably forms part of stridulatory mechanism, another part of which is probably the rather convex costal vein of elytron.

General coloration uniformly green.

Length of body ♂ 58–64, ♀ 60 ; pronotum ♂ 25–28·5, ♀ 30 ; elytron ♂ 47·5–56, ♀ 17·5 ; hind femur ♂ 16–18·5, ♀ 18 mm.

Material examined. Type ♂. Type locality : "Caffraria". (Stockholm Museum.)

NATAL : Richmond ♀ (Type of *P. subalata*) ; "Natal" 1 ♂. TRANSVAAL : Lochiel, 1 ♂.

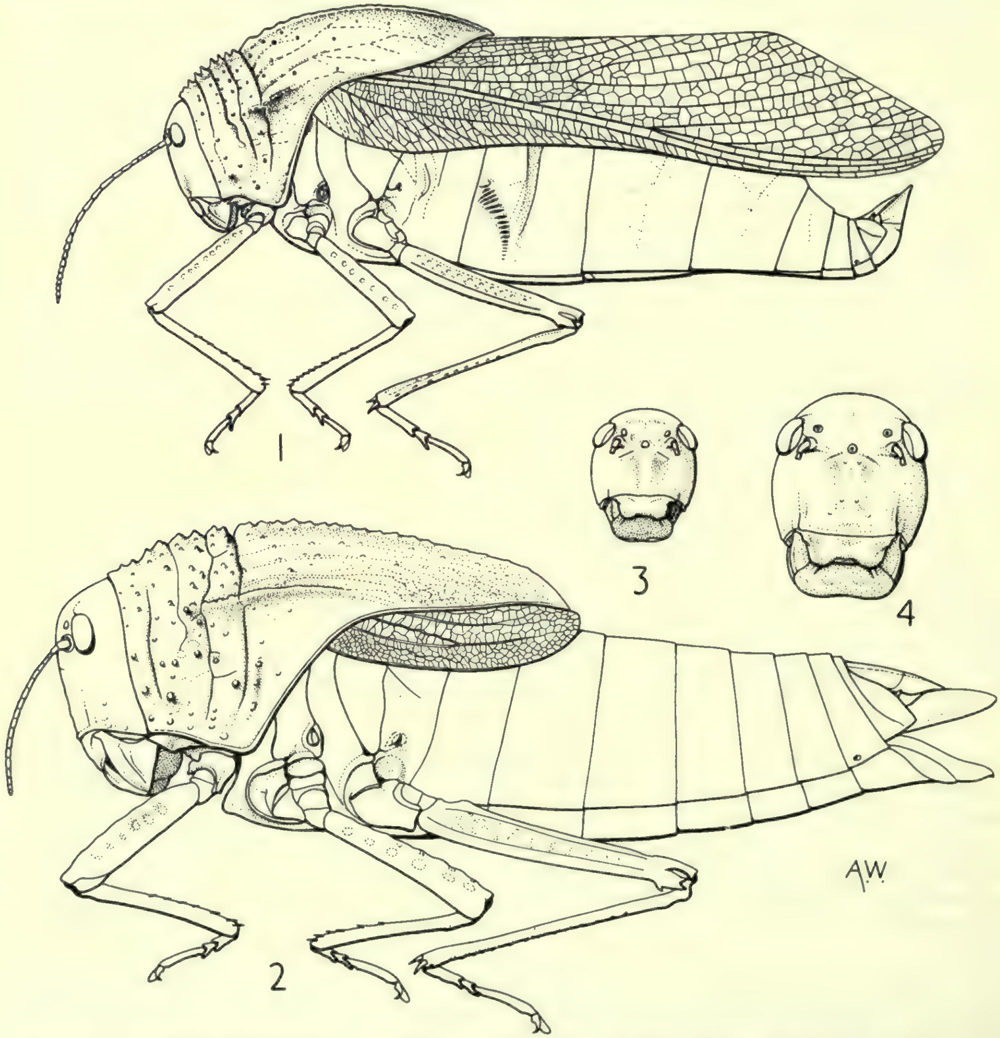

FIG. 26. *Prostalia granulata*. 1, male. 2, female. 3, male face. 4, female face.

PHYSOPHORINA Westwood, 1874

Physophorina Westwood, 1874 : 175.
Shortridgea Péringuey, 1916 : 412. [Syn. Dirsh, 1961, : 379.]

Anterior part of body in male, to sixth segment, strongly bladder-like, inflated ; end of abdomen of usual cylindrical shape. In female, body of normal shape slightly compresses, except pronotum which is strongly inflated. Antenna thin, filiform, much shorter than pronotum. Face flat. Lateral ocelli placed above and slightly externally to antennal bases ; in male all three ocelli large, in female vestigial. Compound eyes, in both sexes, small, oval, moderately convex. Pronotum arcuate, inflated, in female strongly inflated ; three transverse sulci present ; median carina sharp ; lateral carinae present in metazona only, sharp, covered throughout length with small tubercles ; metazona six or seven times as long as prozona, elevated and forming deep fold at posterior sulcus ; its posterior margin elongate angular. Episternum small, angular, with several teeth. Mesosternal interspace deeply concave. Male macropterous ; anterior cubital vein branched ; reticulation sparse. Female brachypterous, elytra reaching middle of fourth abdominal tergite ; venation reduced, reticulation dense. Third abdominal tergite of male with a row of transverse stridulatory ridges, which in lower part are slender and closely placed, in upper part robust and sparsely placed. Anterior and middle femora slender, tuberculate ; hind femur comparatively short, weak, on internal side with short high carina, bearing row of transverse ridges, which forms second part of stridulatory mechanism ; in female, on internal side of hind femur there is a longer row of small teeth, but no ridges on abdomen. Brunner's organ moderately well developed or vestigial. Arolium large. Supra-anal plate in both sexes elongate angular. Cerci short, conical. Subgenital plate in male conical, with obtuse apex ; in female with acutangular apex ; ovipositor short, robust, with straight valves.

Phallic complex. Almost wholly membranous ; lateral parts of ectophallus slightly sclerotized ; dorsal part with a pair of lateral, inflated valves ; ventro-posterior part sac-like, membranous ; opening of endophallus located between valves and sac-like part ; endophallus with a pair of lateral, narrow, longitudinal sclerotizations. Epiphallus approximately shield-or bridge-shaped, dorsal surface covered with numerous small teeth.

Spermatheca large, sac-like, with several pocket-like diverticula.

Type species : *Shortridgea miranda* Péringuey, 1916.

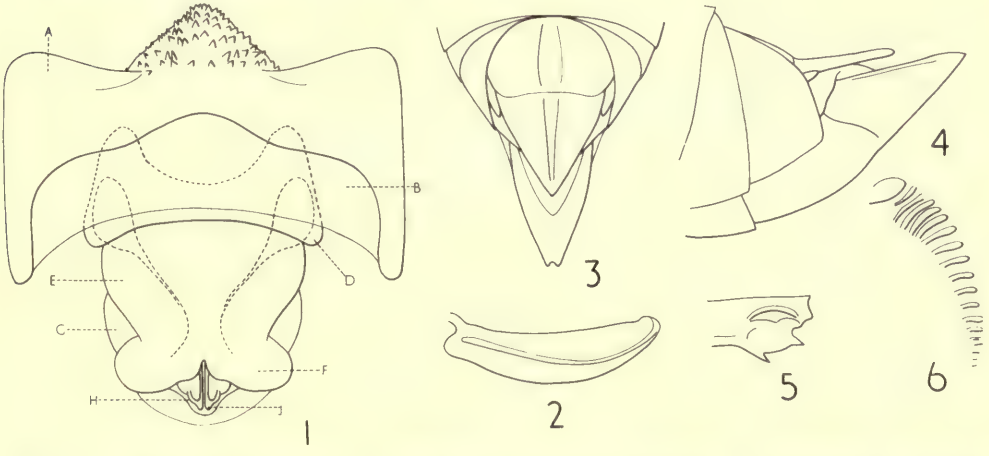

FIG. 27. *Prostalia granulata.* 1, phallic complex, from above. 2, endophallus, lateral view. 3, end of male abdomen, from above. 4, the same, lateral view. 5, left hind knee, external view. 6, abdominal stridulatory ridges (semi-schematic).

Key to Species

MALES

1 (2) Pronotum with high, narrow, sharp crest. Subgenital plate elongate, acutely conical . . . . **livingstoni** Westwood

2 (1) Pronotum with moderately high, comparatively wide and less sharp crest. Subgenital plate short, conical . . . . **miranda** (Péringuey)

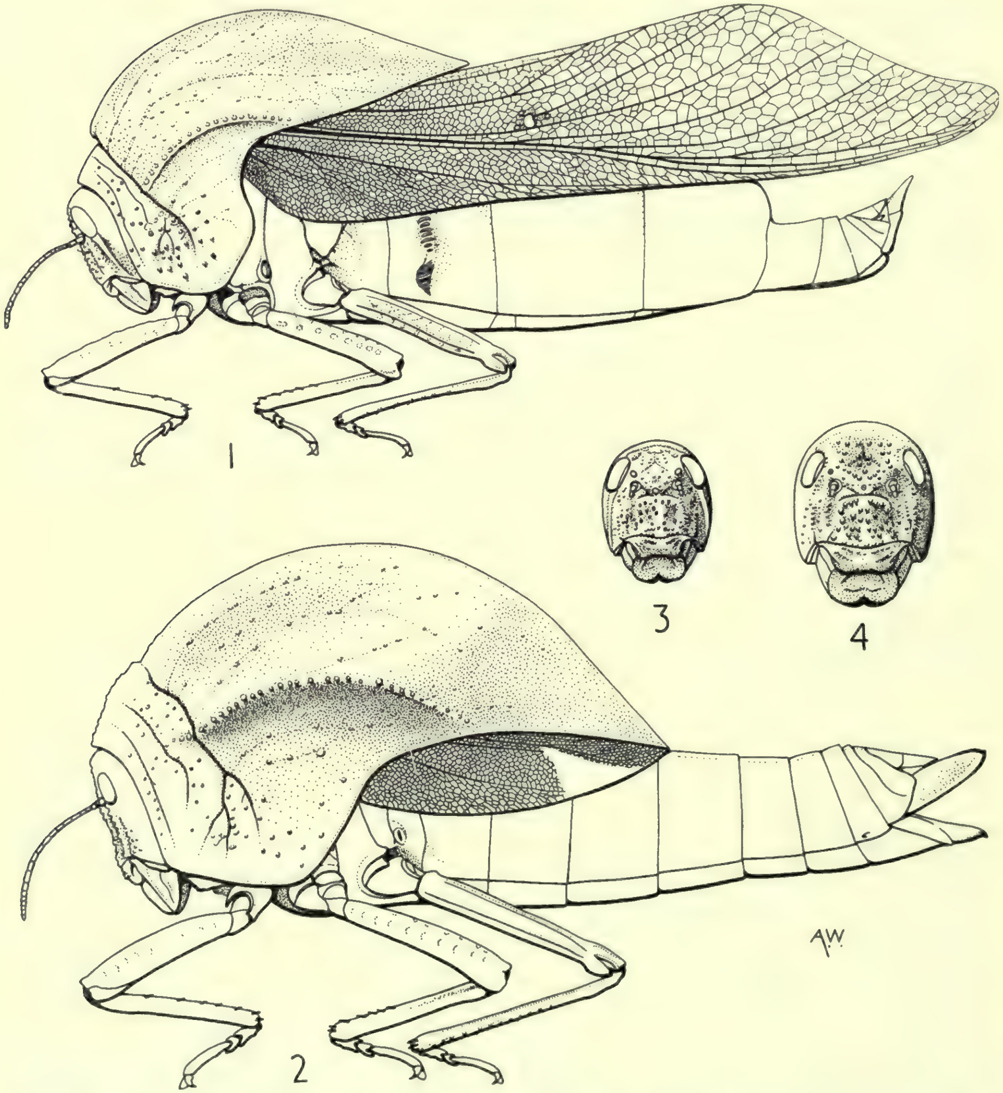

Fig. 28. *Physophorina livingstoni*. 1, male. 2, female. 3, male face. 4, female face.

FEMALES

1 (2) Pronotum strongly inflated, with high crest, convex on sides. Elytra reaching or slightly exceeding end of pronotum. . . . . . ***livingstoni*** Westwood
2 (1) Pronotum less inflated, crest moderately high, with sides concave. Elytra considerably exceeding end of pronotum, reaching seventh abdominal tergite. ***miranda*** (Péringuey)

Physophorina livingstoni Westwood, 1874
(Text-figs. 28, 29)

Physophorina livingstoni Westwood, 1874 : 175. ♀ Nymph.
Cystocoelia absidata Karsch, 1896 : 245. ♂. **syn. n.**

♂. Very large ; body strongly inflated. Integument of head and pronotum moderately rugose, abdomen smooth. Antenna slightly longer than face, 22-segmented. Frons angularly merging with short vertex. Pronotum with narrow, sharp, very high crest ; median carina in prozona almost linear, crossed by posterior and pre-posterior sulci ; first sulcus not reaching median carina ; lateral lobe of pronotum comparatively small, at lower margin rounded. Elytra and wings exceed end of abdomen. Third abdominal tergite with 8 large upper and 19 small lower stridulatory ridges. Subgenital plate elongate, acutely conical, from above with excised apex. Hind femur on internal side with short row of small, transverse sharp ridges.

Phallic complex comparatively large ; dorsal lateral valves large and comparatively strongly inflated, their dorsal, lobe-like parts large. Epiphallus with very deep incision in middle of anterior part and with well developed lateral plates ; small teeth cover anterior margin and are sparsely distributed along the lateral convexities of the epiphallus.

General coloration green ; median and lateral carinae of pronotum brownish or yellowish ; elytron and wing transparent with light green venation and reticulation, in apical part of median area of elytron there is a small, round yellow spot.

♀. Very large. Integument of head and pronotum moderately rugose, abdomen smooth. Antenna 22-segmented about as long as face. Frons angularly merging with very short vertex, which hardly protrudes from under pronotum. Pronotum strongly inflated, with high crest and convex sides, median carina sharp throughout length, crossed by posterior sulcus only, lateral carinae sharp, covered with small tubercles. Elytra not reaching or only slightly exceeding posterior end of pronotum and widely protruding from under lateral margins of metazona. Hind femur on internal side with a row of small, teeth-like tubercles (presumably part of a stridulatory mechanism, the other part being the rather convex radial vein of the elytron).

General coloration light green ; metazona of pronotum, in angle formed by lateral carina and lateral margin, mostly with triangular white spot ; apical part of costal area of elytron with larger, silvery white triangular spot.

Length of body ♂ 70–81, ♀ 89–107 ; pronotum ♂ 38–43, ♀ 62–67 ; elytron ♂ 65–71, ♀ 33–38 ; hind femur ♂ 16·5–18, ♀ 22·5–24·5 mm.

Material examined. 20 ♂, 9 ♀ and 12 nymphs. ♀ nymph type. Type locality " Zambezi ". Hope Dept. of Entomology, University Museum, Oxford.

ZULULAND : " Zululand ". MOZAMBIQUE : Mutuale ; Prov. du Mozambique. NYASALAND : Zomba ; Chileka aerodrome, 2,000 ft. ; Mbidi ; Namiwawa. TANGANYIKA : Handeni, 350 m. ; Kilosa ; Tendaguru ; Chidya (10° 38 S 39° 04 E) ; Liwale ; Mikindani ; Tendaguin ; Mpwapwa (Type locality of *Cystocoelia absidata* Karsch, 1896). UGANDA : " Uganda ".

The specimens (2 ♂, 1 ♀) from Uganda, which is the northernmost locality for the whole family, were collected by Dr. Baxter. Unfortunately no other particulars concerning these specimens are available.

Physophorina miranda (Péringuey, 1916) **comb. n.**

(Text-figs. 30, 31)

Shortridgea miranda Péringuey, 1916 : 412. ♂.

♂. Large. Body strongly inflated. Integument of head and pronotum slightly rugose, abdomen smooth. Antenna about as long as face, 22-segmented. Frons angularly merging

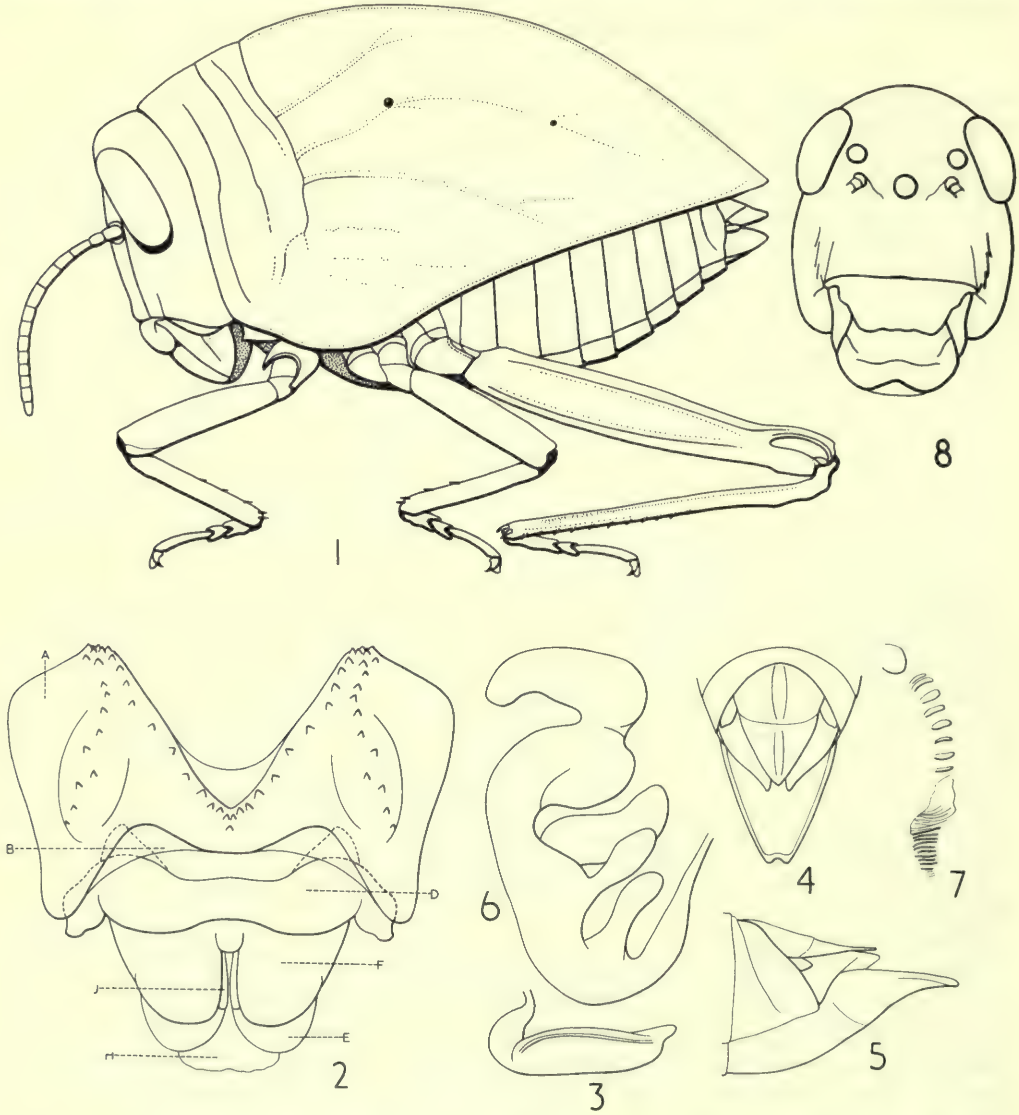

FIG. 29. *Physophorina livingstoni.* 1, first instar nymph. 2, phallic complex, from above. 3, endophallus, lateral view. 4, end of male abdomen, from above. 5, the same, lateral view. 6, spermatheca (in natural state 4·5 mm. length). 7, abdominal stridulatory ridges (semi-schematic). 8, face of adult male.

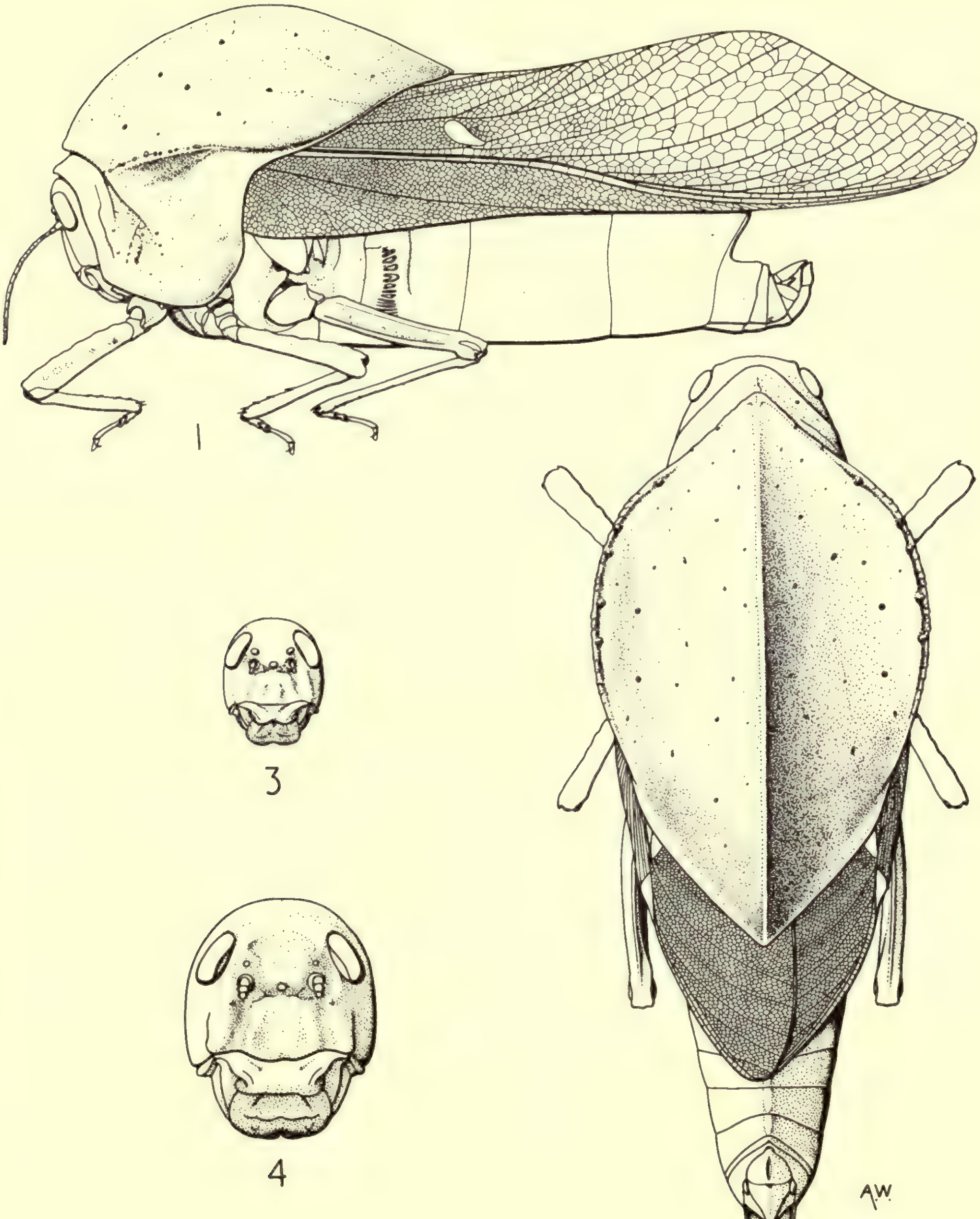

FIG. 30. *Physophorina miranda.* 1, male. 2, female. 3, male face. 4, female face.

with very short vertex. Pronotum with crest moderately high, narrow and sharp ; metazona in front, at posterior sulcus, forming deep fold and overhanging prozona, sometimes almost completely ; three transverse sulci present ; median carina in prozona hardly noticeable, in metazona sharp ; lateral carinae sharp, covered with small tubercles ; lateral lobe of pronotum small with lower margin rounded. Elytra and wings exceed end of abdomen. Third abdominal tergite with 7 large irregularly shaped ridges and 13 small regular stridulatory ridges. Subgenital plate short, acutely conical, from above with slightly excised apex. Hind femur on internal side with short high carina, bearing row of small transverse ridges.

Phallic complex comparatively small ; dorsal lateral valves comparatively small, their dorsal, lobe-like parts small. Epiphallus with shallow excision in middle of anterior part, with lateral plates large, but not very well defined. Small teeth cover anterior and middle part of epiphallus.

General coloration green ; median carina of pronotum yellowish ; elytron and wing transparent, with green venation and reticulation, in apical part of median area of elytron a small, oblique, silvery white spot.

♀. Larger than male. Integument of head and pronotum slightly rugose, abdomen smooth. Antenna 22-segmented, slightly shorter than face. Frons angularly merging with short vertex. Pronotum moderately strongly inflated, with comparatively moderately high crest and concave sides ; median carina in prozona obtuse, in metazona sharp ; lateral carinae sharp, covered with small tubercles. Elytra shortened, exceeding end of pronotum and reaching sixth abdominal tergite. Hind femur on internal side, with a row of small, tooth-like tubercles (presumably part of stridulatory mechanism, the other part possibly being the rather convex radial vein of the elytron).

General coloration green ; median carina of pronotum sometimes yellow ; lateral carinae white with reddish tubercles ; metazona of pronotum, in angle formed by lateral carina and lateral margin, with silvery white, triangular spot ; elytron in region of base of radial vein with small white spot, in apical part of costal area with large, triangular white spot.

Length of body ♂ 59–68, ♀ 72–89 ; pronotum ♂ 29–37, ♀ 42–46 ; elytron ♂ 52·5–62, ♀ 33–35 ; hind femur ♂ 14–15·5, ♀ 19·5–22 mm.

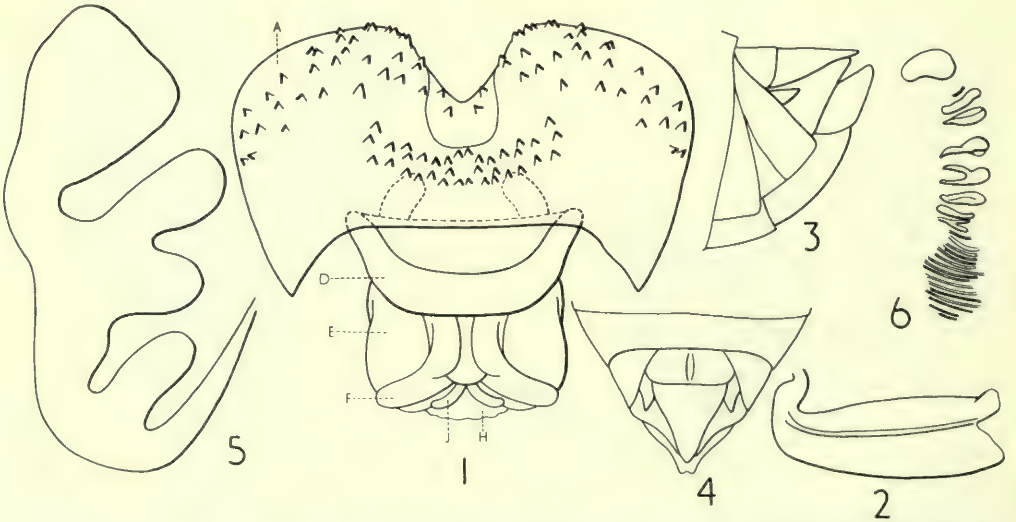

FIG. 31. *Physophorina miranda*. 1, phallic complex, from above. 2, endophallus, lateral view. 3, end of male abdomen, lateral view. 4, the same, from above. 5, spermatheca. 6, abdominal stridulatory ridges (semi-schematic).

Too few specimens were studied to judge the variability of the species, except the coloration. It is mostly green or brownish (but the latter may be a postmortem change). Sometimes the pronotum in both sexes is covered with sparsely scattered, small, blackish dots.

Material examined. 5 ♂, 2 ♀. Type ♂. Type locality : Zululand, Eshowe. (South African Museum.)

CAPE PROVINCE : Port St. Johns. NATAL : Annerley ; Eshowe ; Nkandhla Forest. TANGANYIKA : Liwale. January, April, October, November.

PNEUMORA Thunberg, 1775

Pneumora Thunberg, 1775 : 255.
Pneumora (*Cystocoelia*) Serville, 1838 : 713 [Syn. Kirby, 1910 : 65].

Anterior part of body in male, to sixth abdominal segment, strongly inflated, bladder-like, end of abdomen of normal cylindrical shape. In female, body of normal shape, cylindrical. Antenna thin, filiform, much shorter than pronotum. Face flat. Lateral ocelli placed above and slightly externally to antennal bases ; in male all three ocelli large, in female vestigial. Compound eyes in both sexes small, oval, moderately convex. Pronotum low arcuate ; three transverse sulci present; median carina in male absent in prozona, low and sharp in metazona; in female, low and sharp in prozona and comparatively high and sharp in metazona; with small tubercles on whole length ; metazona much longer than prozona, forming deep fold at posterior sulcus and overhanging above prozona, in male almost covering it, in female covering only small part of it ; posterior margin of metazona elongate, angular. Episternum with large anterior tooth. Mesosternal interspace deeply concave. Male fully winged ; anterior cubital vein of elytron branched ; reticulation sparse. Female brachypterous, elytron reaching fifth abdominal tergite ; venation reduced ; reticulation dense. Third abdominal tergite of male with a row of transverse stridulatory ridges, which in upper part of row are large and robust, sparsely placed, in lower part small, slender, closely placed. Anterior and middle femora slender, slightly tuberculate ; hind femur short and weak ; on internal side with short high carina, bearing a row of transverse ridges which forms second part of stridulatory mechanism ; in female, on internal side of hind femur there is a longer row of small teeth, but no ridges on abdomen. Brunner's organ present, sometimes reduced. Arolium large. Supra-anal plate angular in both sexes. Cerci short, conical. Subgenital plate in male short, conical, from above with angularly excised apex ; in female with acutangular apex. Ovipositor moderately short, robust, with straight valves.

Phallic complex. Almost wholly membranous ; lateral part of ectophallus slightly sclerotized ; dorsal part with a pair of lateral, inflated valves and in proximal part with slight sclerotization ; ventro-posterior part sac-like membranous ; opening of endophallus located between valves and sac-like posterior part ; endophallus with a pair of lateral, narrow longitudinal sclerotizations, protruding in distal part at opening of endophallus. Epiphallus approximately shield-like, its dorsal surface covered with numerous small teeth.

Spermatheca large, sac-like, with several pocket-like diverticula.

Type species : *Pneumora sexguttata* Thunberg, 1775.

Pneumora inanis (Fabricius, 1775)

(Text-figs. 32, 33)

Gryllus inanis Fabricius, 1775 : 827. ♂.
Pneumora sexguttata Thunberg, 1775 : 258. ♂. [Syn. Fabricius, 1781 : 363].
Pneumore scutellaire Latreille, 1830 : pl. 19. ♀. [Syn. Kirby, 1902 : 60].
Pneumora inanis (Fabricius) Roberts, 1941 : 19.

♂. Very large ; body strongly inflated. Integument of head and pronotum moderately rugose, granulose and sparsely hairy, abdomen smooth. Antenna slightly longer than face, 23-segmented. Frons angularly merging with short vertex. Pronotum in metazona with sharp low median carina ; lateral carinae weak ; lateral lobe of pronotum with lower margin rounded. Elytra and wings exceed end of abdomen. Third abdominal tergite with 6 large and 12–13 small stridulatory ridges. Internal side of hind femur with short high carina, bearing sharp transverse ridges.

General coloration green ; posterior margin of pronotum whitish, sometimes with reddish-brown narrow line between whitish border and green basic colour of pronotum ; dorsum often

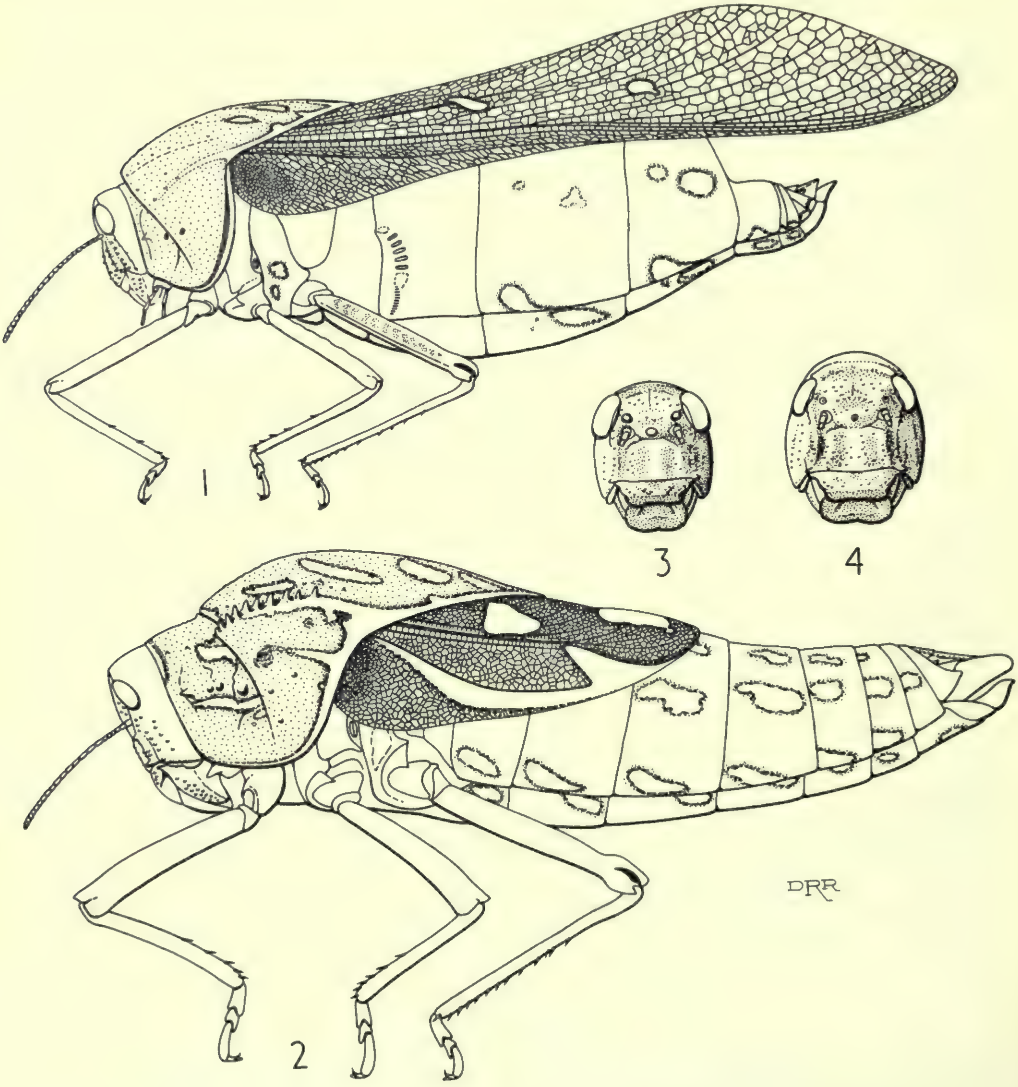

Fig. 32. *Pneumora inanis*. 1, male. 2, female. 3, male face. 4, female face.

with three pairs of oblique longitudinal white lateral stripes ; eltyra and wings greenish transparent with green venation and reticulation ; on elytron two silvery white, short, oblique spots ; abdomen uniformly green or with several whitish spots.

♀. Very large. Body subcylindrical, not inflated. Integument of head and pronotum granulose and slightly hairy, abdomen smooth. Antenna about as long as face, 23-segmented. Frons angularly merging with short vertex. Pronotum with sharp, granulose carina ; lateral carinae strong, with teeth covering almost whole carina ; strong teeth on lateral lobes and smaller teeth on dorsum of pronotum present. Hind femur on internal side with short carina, bearing a row of small, tooth-like tubercles. No ridges on abdomen.

General coloration green ; posterior margin of pronotum silvery white, with reddish-brown border line between white and basal green of pronotum ; carinae brown-reddish ; below posterior half of lateral carina a silvery-white stripe ; dorsum with three to five oblique, elongate, lateral silvery-white stripes, with brown-reddish borders ; elytron green ; base of costal area blackish ; middle of elytron with two large, silvery white spots of irregular form with reddish borders ; costal area with similar stripe, forming two narrow angular projections ; side of abdomen with two rows of large and two rows of small silvery-white spots with reddish borders.

Length of body ♂ 62–67, ♀ 70–86 ; pronotum ♂ 23·5–27, ♀ 30–38 ; elytron ♂ 61–67·5, ♀ 25–36 ; hind femur ♂ 16–17·5, ♀ 20–21·5 mm.

This species varies in body size and in pattern and coloration. The silvery stripes and spots may be larger or smaller and on the pronotum from three to five. Coloration from brown-reddish to greenish.

Material examined. 20 ♂, 16 ♀. Type ♂. Type locality : Cape of Good Hope. (Banks' collection, in British Museum (Natural History).)

CAPE PROVINCE : East London ; Grahamstown ; Alexandria ; Somerset East ; Hogsback. NATAL : Yellowwoods, Karkloof ; Balgowan ; Hilton Rd ; Bulwer ; Nottingham Road. TANGANYIKA : Lukuledi.

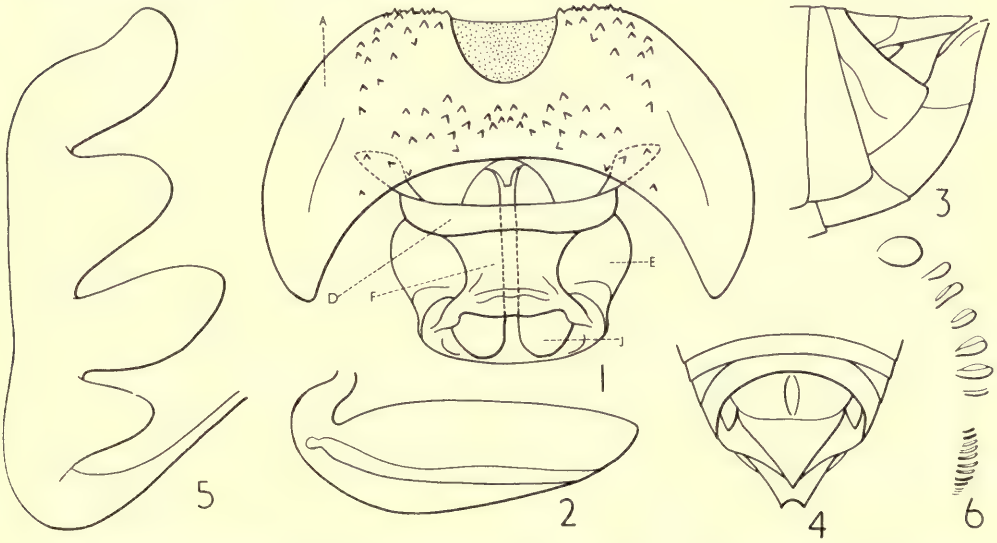

FIG. 33. *Pneumora inanis*. 1, phallic complex, from above. 2, endophallus, lateral view. 3, end of male abdomen, lateral view. 4, the same, from above. 5, spermatheca. 6, abdominal stridulatory ridges.

PARABULLACRIS Dirsh, 1963

Parabullacris Dirsh, 1963 : 178.

Comparatively small and slender ; appearance nymph-like. Male body not inflated. Integument granulose. Antenna short, slightly widening towards apex. Head comparatively narrow ; frons flat, angularly merging with vertex ; ocelli large in male, vestigial in female, lateral ocelli placed above and slightly internally to antennal bases ; compound eyes moderately

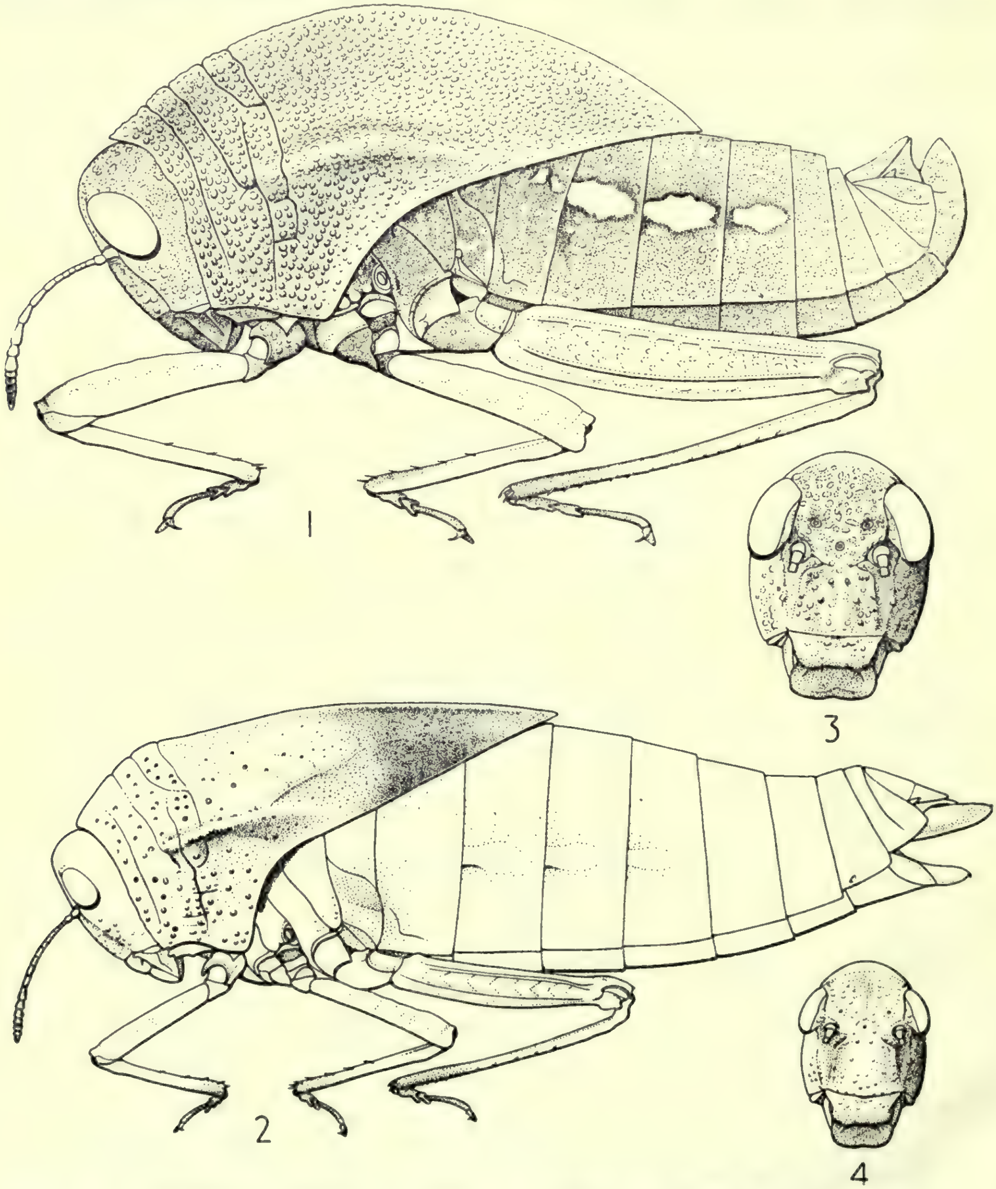

FIG. 34. *Parabullacris vansoni*. 1, male. 2, female. 3, male face. 4, female face.

large, oval and moderately convex. Pronotum strongly elongate, in profile regularly arcuate, in female low arcuate ; four transverse sulci present ; metazona about three times as long as prozona, its posterior margin acutangular ; lateral carinae not strongly developed. Vestigial elytra and wings present and completely hidden under pronotum. Abdomino-femoral stridulatory mechanism highly reduced : a few stridulatory ridges on third abdominal tergite and serration on internal side of hind femur being hardly detectable. Hind femur moderately short ; Brunner's organ present. Arolium large. Abdomen slender, of usual acridoid shape. Supra-anal plate in both sexes elongate angular, with transverse furrow ; cercus in both sexes short, conical ; subgenital plate in male conical, at apex slightly excised ; in female obtusangular ; ovipositor moderately short, with straight valves.

Phallic complex of usual *Bullacris* group type, membranous, on dorsal side with a pair of lateral inflated valves and ventro-posterior membranous, sac-like formation ; endophallus with a pair of elongated lateral sclerotizations. Epiphallus shield-like, with protruding posterior projections and three median teeth at anterior margin.

Type species : *Parabullacris vansoni* Dirsh, 1963.

This genus differs from *Bullacris* in the non-inflated abdomen of the male, the vestigial elytra and wings, vestigial stridulatory mechanism and the more compressed pronotum. The females of both genera could easily be confused.

Parabullacris vansoni Dirsh, 1963

(Text-figs. 34, 35)

Parabullacris vansoni Dirsh, 1963 : 179.

♂ (Type). Antenna about one quarter length of head and pronotum together, 20-segmented. Fastigial furrow very weak ; vertex short. Median carina of pronotum sharp, regular ; crossed by all four deep transverse sulci ; lateral carinae weakly pronounced. Anterior and middle femora moderately slender ; hind femur short, comparatively thick ; lower lobes of hind knee angular, with rounded apices.

General coloration olive-brownish ; lateral margin of metazona whitish ; four white spots on sides of abdomen.

♀. Much larger than male. Antenna 20-segmented. Ocelli vestigial. Pronotum less arcuate than in male, approximating to tectiform, with metazona more elongate. Coloration and pattern as in male, but white spots and the sides of the abdomen fading and sometimes completely disappearing.

Length of body ♂ 17·7–22, ♀ 32–39 ; pronotum ♂ 12–15, ♀ 19–21·5 ; hind femur ♂ 8·6–9·8, ♀ 9–11 mm.

Material examined. Type ♂. Type locality : Cape Province, Nababiep. (Transvaal Museum).

CAPE PROVINCE : Nababiep, 13–14.viii.1961, 3 ♂, 5 ♀ (*G. van Son* & *L. Vari*) ; Namaqualand, Van Rhyns Pass, viii.1961, 2 ♀, 6 ♀, Leipoldtville, Eland's Bay, 4 ♀, 4 m. N. Bitterfontein, 3.ix.1961, 1 ♂, 7 ♀ (*H. Dick Brown* & *W. Fürst*) ; O'okiep, iii.1956, 3 ♂ ; Namaqualand, Kamieskroon, ix.1930, 1 ♀.

PNEUMORACRIS Dirsh, 1963

Pneumoracris Dirsh, 1963 : 180.

Comparatively small and slender ; appearance nymph-like. Male body not inflated. Integument of head and pronotum strongly granulose, abdomen smooth. Antenna comparatively long, slightly widening towards apex. Head narrow ; frons slightly convex, roundly merging with vertex ; ocelli very small in both sexes, lateral ocelli placed above and slightly internally to the antennal bases ; compound eyes large, oval, strongly convex. Pronotum elongate, tectiform and slightly saddle-shaped ; four transverse sulci present ; prozona forming tubercle-like median projection in front of posterior sulcus and, in anterior part of metazona, another similar tubercle-like median projection ; metazona two or more times as long as prozona, the posterior part with a pair of lateral depressions, its posterior margin acutangular ; all pronotal characters more sharply expressed in males than in females. Elytra and wings vestigial and completely hidden under pronotum. Abdomino-femoral stridulatory mechanism absent. Hind femur comparatively long and strong ; Brunner's organ not detectable. Arolium large. Abdomen slender, of usual acridoid shape. Supra-anal plate in both sexes elongate angular, with transverse furrows ; cercus in both sexes short, conical, subgenital plate in male conical, at apex slightly excised ; in female obtusely angular ; ovipositor moderately long, with straight comparatively robust valves.

Phallic complex of usual *Bullacris* group type, membranous, dorsally with a pair of lateral inflated valves, and ventro-posteriorly of membranous, sac-like form ; endophallus with a pair of elongated lateral sclerotizations. Epiphallus shield-like, with slightly protruding posterior projections and with three median teeth at anterior margin.

Type species : *Pneumoracris browni* Dirsh, 1963.

This genus superficially may be compared with *Pneumora namaqua* Péringuey, 1916. It shares similar structure of the pronotum and similar pattern, but differs in all the other essential characters mentioned in the description. On the basis of similarity of the pronotum Péringuey described a female of *Pneumoracris browni* as the female of *Pneumora namaqua*. This error is corrected now, since a good series of both males and females of *Pneumoracris browni* is available.

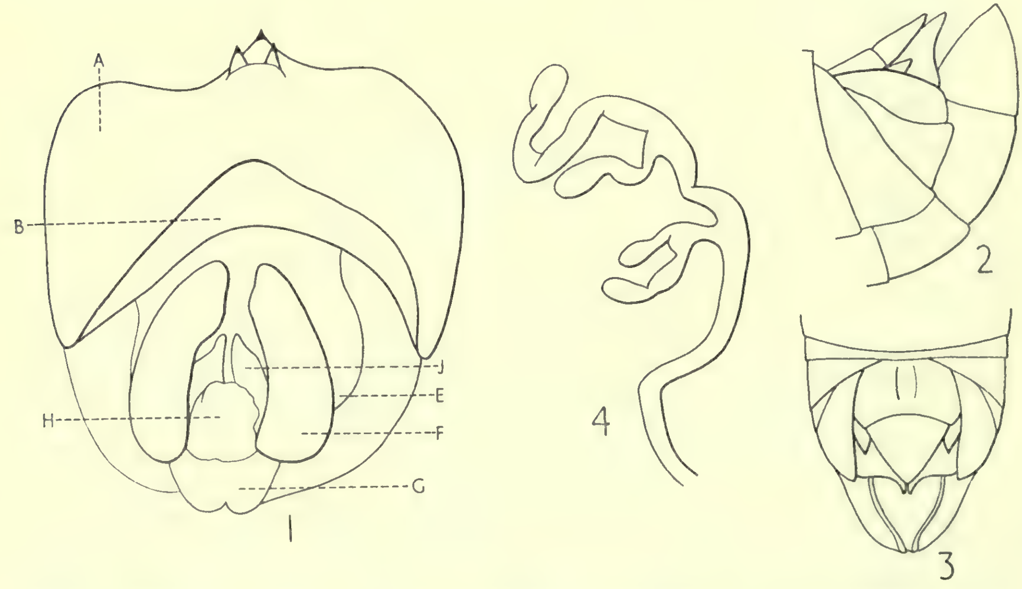

FIG. 35. *Parabullacris vansoni*. 1, phallic complex, from above. 2, end of male abdomen, lateral view. 3, the same, from above. 4, spermatheca.

Pneumoracris browni Dirsh, 1963
(Text-figs. 36, 37)

Pneumoracris browni Dirsh, 1963 : 181.

♂ Type. Antenna slightly more than half length of head and pronotum together, 21-segmented. Fastigial furrow weak, vertex short. Median carina of pronotum wide and thick, forming tubercles in posterior part of prozona and anterior part of metazona ; lateral carinae

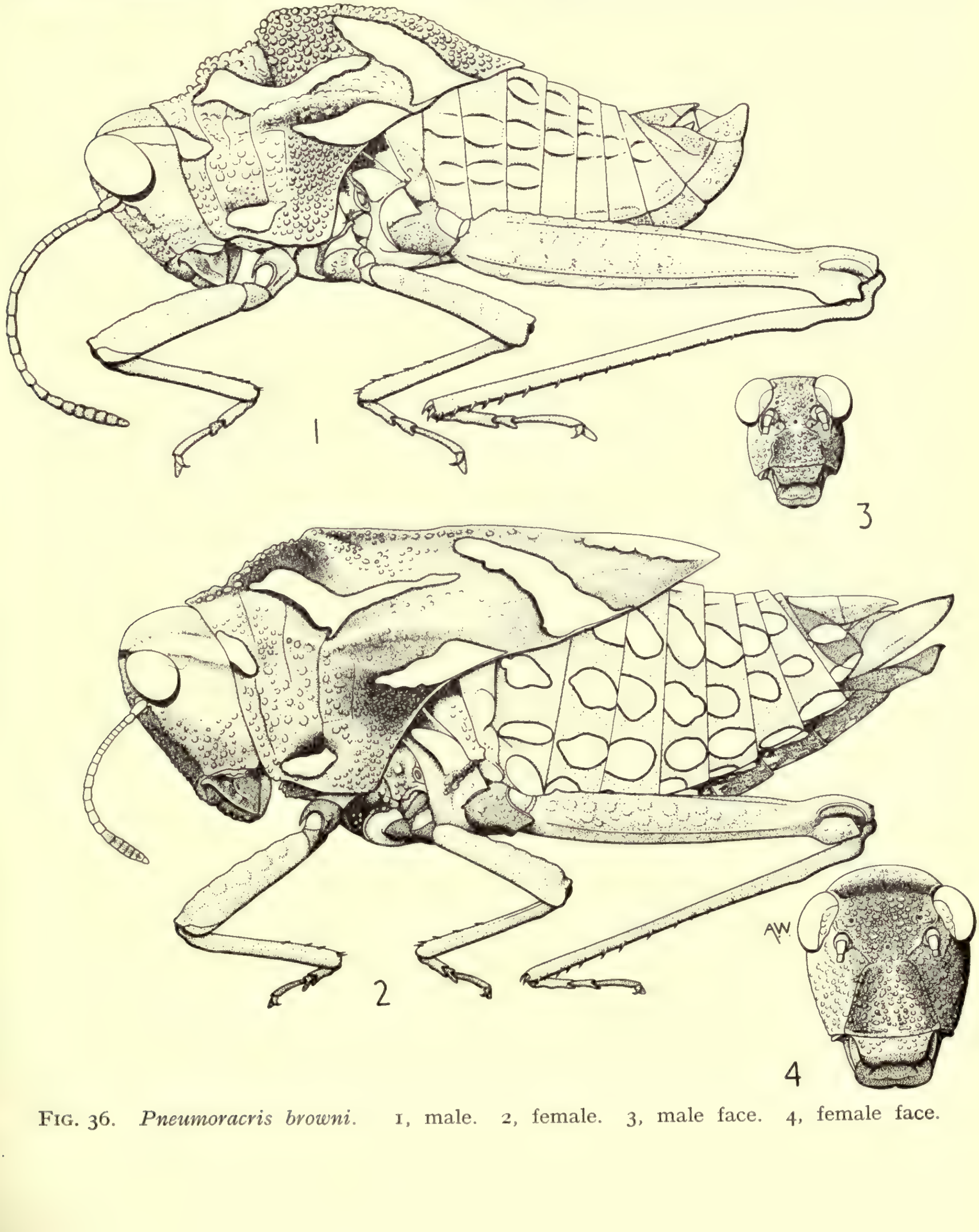

Fig. 36. *Pneumoracris browni*. 1, male. 2, female. 3, male face. 4, female face.

represented by convex lateral margins of metazona. Anterior and middle femora comparatively robust, widening towards apex ; hind femur rather thick ; lower lobes of hind knee angular, with obtuse apices.

General coloration greenish, with brown spots and silvery scale-like patches and spots ; frons brownish ; vertex and genae green ; vertex with median yellowish stripe ; a pair of yellowish postocular stripes present ; pronotum greenish, median part above brownish, lateral lobes brownish, with four patches of silver-white of irregular form, forming definite pattern ; pleura with large silvery white spot, becoming yellowish ; abdomen with three rows of lateral spots, yellowish white with blackish margins.

♀ Paratype. As the male, but larger. Antenna 20-segmented. Ocelli vestigial. Pronotum with less developed lateral impressions, less pronounced tubercles of median carina and more elongate metazona.

Length of body ♂ 11·5–14, ♀ 22–29 ; pronotum ♂ 8–8·2, ♀ 15–16·5 ; hind femur ♂ 9·1–9·6, ♀ 11·5–12 mm.

Material examined. Type ♂. Type locality : Cape Province, 5 m. East Kamieskroon. (Transvaal Museum.)

CAPE PROVINCE : 5 m. E. Kamieskroon, 18–19.ix.1961, 4 ♂ (including type), 2 ♀ ; 4 m. N. Bitterfontein, 3.ix.1961, 2 ♀ (*H. Dick Brown* & *W. Fürst*). Nababiep, 13–14.viii.1961, 2 ♂, 8 ♀ (*G. Van Son* & *L. Vari*) ; Springbokfontein, 1 ♀ (paratype of *Pneumora namaqua* Péringuey, 1916).

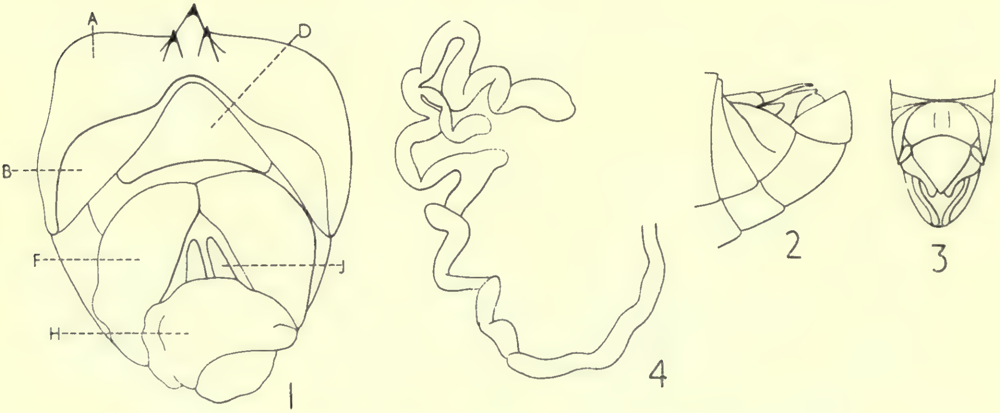

FIG. 37. *Pneumoracris browni*. 1, phallic complex. 2, end of male abdomen, lateral view. 3, the same, from above. 4, spermatheca.

PARAPHYSEMACRIS Dirsh, 1963

Paraphysemacris Dirsh, 1963 : 183.

Comparatively small and slender ; appearance nymph-like ; male body not inflated. Integument of head and pronotum strongly tuberculate and spiny, with silvery white scale-like flattened tubercles. Antenna moderately long, slightly widening towards apex. Head moderately wide ; frons slightly convex, roundly merging with vertex ; ocelli in male moderately large, lateral ocelli placed above and slightly internally to antennal bases ; compound eyes small, oval, strongly convex. Pronotum elongate, tectiform ; median carina in prozona forming three large, upwardly protruding teeth and numerous small teeth on sides ; in metazona median carina serrated and slightly arcuate ; four transverse sulci present ; at posterior sulcus dorsum constricted ; metazona about twice as long as prozona, its posterior margin angular. Elytra and wings vestigial and completely hidden under pronotum. Abdomino-femoral stridulatory mechanism absent, but vestige of serration on internal side of hind femur is detectable. Hind femur comparatively long ; Brunner's organ absent. Arolium large. Abdomen slender, of usual acridoid shape. Supra-anal plate elongate angular, with transverse furrow ; cercus short, conical ; subgenital plate acutely conical, at apex slightly excised.

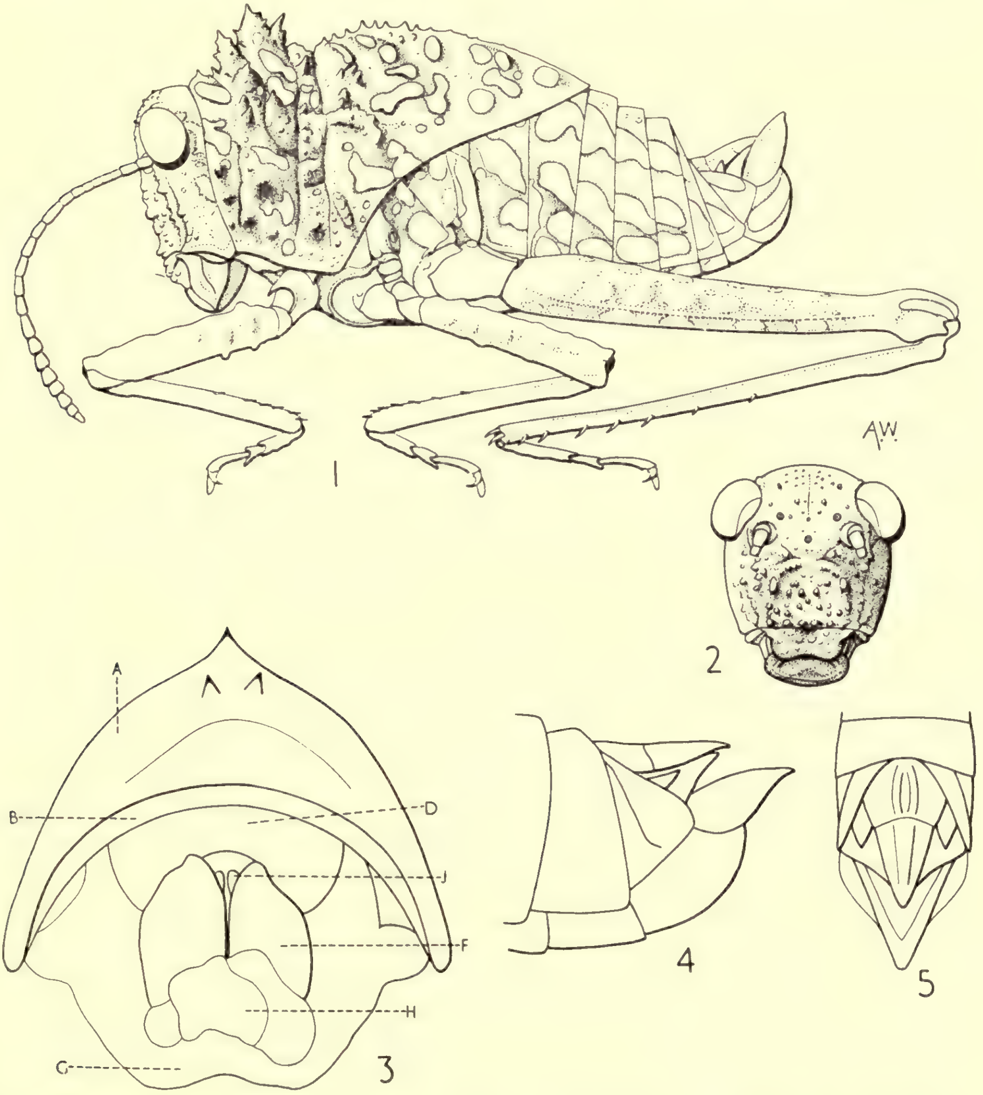

FIG. 38. *Paraphysemacris spinosus.* 1, male. 2, male face. 3, phallic complex, from above. 4, end of male abdomen, lateral view. 5, the same, from above.

Phallic complex of usual *Bullacris* group type, membranous, on dorsal side with a pair of lateral, inflated valves, and in ventro-posterior part is a membranous sac-like formation ; endophallus with a pair of elongate, lateral sclerotizations. Epiphallus shield-like, with protruding posterior projections and three teeth at anterior margin.

Type species : *Paraphysemacris spinosus* Dirsh, 1963.

In shape and pattern this genus superficially resembles *Physemacris*. However, it probably has only remote relationship with that genus. The non-inflated abdomen, absence of stridulatory mechanism and vestigial wings are sufficient characters to place *Paraphysemacris* into an entirely different group.

Paraphysemacris spinosus Dirsh, 1963
(Text-fig. 38)

Paraphysemacris spinosus Dirsh, 1963 : 184.

♂ Type. Antenna 22-segmented, about half as long as head and pronotum together. Fastigial furrow weak ; vertex short and broad. Prozona of pronotum with three large, median teeth and numerous lateral teeth and tubercles ; metazona tuberculate ; lateral carinae detectable as elongate tubercle-like formations. Anterior and middle femora tuberculate, moderately slender ; hind femur long, slender but strong ; lower lobes of hind knee angular, with obtuse apices.

General coloration greenish ; scale-like flattened tubercles and spots scattered on pronotum, pleura and abdomen, spots of irregular form, silvery white or slightly yellowish.

Only males known.

Length of body ♂ 22–25·5 ; pronotum ♂ 11·5–12 ; hind femur ♂ 12·5–13·2 mm.

Material examined. Type ♂. Type locality : Cape Province : Kuyana, (British Museum (Natural History) ; " South Africa ". 1 ♂ paratype. (Stockholm Museum).

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A REVISION OF THE GENUS *MICROPENTILA* AURIVILLIUS (LEPIDOPTERA : LYCAENIDAE)

BRITISH
NATURAL

H. STEMPFFER
AND
N. H. BENNETT

BULLETIN OF
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ENTOMOLOGY Vol. 15 No. 11
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BRITISH MUSEUM
1 JUN 1965
NATURAL HISTORY

BY

H. STEMPFFER
4 rue St. Antoine, Paris, IVe

and

N. H. BENNETT
British Museum (Natural History)

Pp. 397–434 : 31 *Text-figures*, 4 *Plates*

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A REVISION OF THE GENUS *MICROPENTILA* AURIVILLIUS (LEPIDOPTERA : LYCAENIDAE)

By H. STEMPFFER AND N. H. BENNETT

SYNOPSIS

The genus *Micropentila* is divided into nine species-groups, based on genitalic characters. In addition to the twelve species described by earlier authors sixteen new ones are described and figured hereunder.

THE genus *Micropentila* was erected by Aurivillius in 1895 in Entomologisk Tidskrift **16** : 202, with *Liptena adelgitha* Hewitson as generotype. As generic characters the author pointed out :—Club of the antenna oval, short and well differentiated from the shaft. Underside of the palpus furnished with erect bristles or piliform scales. The author also stated that the venation of *Micropentila* is like that of *Liptena*, but it would be more accurate to say like that of some *Liptena*, for the venation is not uniform throughout the latter genus.

In *Micropentila* the venation is as follows :—

Forewing : 12 veins, 4 from the lower angle of the cell, 5 nearer to 6 than to 4, 6 from the upper angle of the cell, 7 also from this angle or a little behind, 8 and 9 stalked on 7, 10 and 11 free from the upper border of the cell. *Hindwing* : 3 and 4 from the lower angle of the cell or very shortly stalked, 5 nearer to 6 than to 4, 6 from the upper angle of the cell, 7 from a little behind the angle.

♂. *Genital armature* : Of the general Liptenine pattern, but exhibiting considerable diversity in the shape of the penis, according to species. It appears, therefore, that *Micropentila* does not constitute a truly homogeneous phyllum. However, as the genus is well characterized by a common pattern of facies, medium to small size, upperside black with small white dots or a postdiscal yellow stripe, underside black with numerous white spots or a postdiscal yellow stripe, the genus is easily recognized from these characters at first glance. So, for convenience of study, we have not divided *Micropentila* into subgenera according to penis shape, but only into sections, or species-groups, detailed hereunder.

Section A (penis bulbous at base, with an excised distal end).
adelgitha Hewitson, *subplagata* Baker and *souanke* sp. n.

Section B (penis long and curved, valvae like those of some *Liptena*).
fulvula Hawker Smith

Section C (penis long, cylindrical, bent at a right-angle near its base, distal end coiled).
adelgunda Staudinger, *bitjeana* sp. n., *dorothea* Baker and *gabunica* sp. n.

Section D (penis rather long, tapering to a fine point).
brunnea Kirby, *victoriae* sp. n., *katerae* sp. n., *f. ?* (Uganda, Bwamba), *f. ?* (Uganda, Kigezi, Kayonza Forest), *flavopunctata* sp. n., *jacksoni* Talbot, *bakotae* sp. n., *nigeriana* sp. n., *mpigi* sp. n., *fontainei* sp. n., *fuscula* Grose Smith, *ogojae* sp. n. and *kelleana* sp. n.

Section E (penis shorter and thicker than in D).
alberta Staudinger and *mabangi* Baker

Section F (penis long, thin, strongly arched).
cingulum H. H. Druce and *ugandae* Hawker Smith

Section G (penis long, slightly arched).
sankuru sp. n.

Section H (penis short, distal extremity bulbous, bifid).
katangana sp. n. and *cherereti* sp. n.

Section I (penis short, distal extremity broadly concave).
bunyoro sp. n.

Genitalia text-figures

It will be observed that each group of genitalia text-figures bears a single identifying serial number. In order to help with the comparison of the component parts a typical armature is figured below, with the parts identified by initial letters, which are explained in the legend.

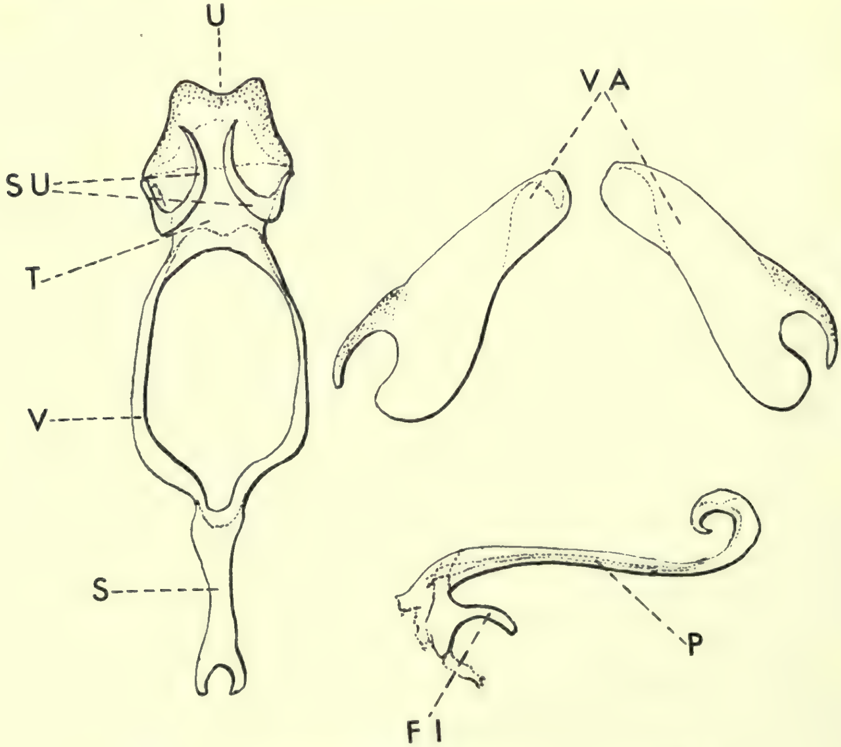

FIG. 1. A typical *Micropentila* genitalia, *M. dorothea* ♂.

U—uncus ; SU—subunci ; T—tegumen ; V—vinculum ;
S—saccus ; VA—valvae ; P—penis ; FI—fultura inferior.

Notes on Life-histories and Habits.

Very little is known of the life-histories and habits of *Micropentila* and we are indebted to T. H. E. Jackson of Kitale for the following information.

> " Apart from the fact that the eggs are laid on twigs or lichen-covered tree-trunks frequented by *Crematogaster* ants the early stages of the genus are completely unknown.
>
> The many species are mostly rare and are found only in tropical forest regions ; they prefer semi-shade and shun full sunlight. They are usually found as singletons, but occasionally in some species, a few males will be found together, flying rapidly and settling on the ends of dead twigs. Due to their small size, cryptic colouring and rapid flight in half light they are exceedingly difficult to follow.
>
> A few of the species are reasonably common ; *M. adelgitha* Hew., in Nigeria and the Cameroons, can be found in some numbers on occasions, feeding from plant-glands on tall grasses bordering forest paths ; *M. brunnea* Kirby flies low down and can be found in singletons, sitting on or flying round dead twigs on the verges of the paths ; the same applies to *M. victoriae* sp. n. in Uganda ; *M. jacksoni* Talbot can often be found in three or four small communities along a certain path at Katera, Sango Bay, Uganda, it flies about twelve feet up, settling on dead twigs, and there is usually a female around.
>
> Other species are exceedingly rare and occur only in " pockets " or " islands " in the forest, always associated with an ant-tree. Examples of these are *M. katerae* sp. n. and *M. subplagata* Baker. Both of these occurred in one place only, also in the Sango Bay area ; each species was associated with a single ant-tree and a few specimens were taken year after year. Then the two trees were cut down and neither species has been seen since.
>
> Finally, some species seem to be confined to the canopy and the building of ladders up suitable *Crematogaster*-trees, in recent years, has produced a few species in some numbers, which have never been taken at ground level.
>
> *Micropentila* is an intriguing genus, well worth further study, as it is obvious that many more species await discovery."

ACKNOWLEDGEMENTS

We are greatly indebted to T. H. E. Jackson of Kitale, Kenya, not only for providing a large proportion of the material studied to make this revision, but also, as the man on the spot, for all the information, already quoted, concerning life history and habits. To Monsieur L. A. Berger we are grateful for the loan of types from the Tervuren Museum. Our thanks also to Dr. H. J. Hannemann, who provided us with types from the Zoologisches Museum der Humboldt-Universität zu Berlin. We also wish to thank B. H. Hanson of the Stockholm Museum for precise information as to the fate of the type of *M. triangularis*.

Section A

Micropentila adelgitha (Hewitson)

(Text-fig. 2)

Liptena adelgitha Hewitson, 1874 : 36.

Liptena moneta Mabille, 1890 : 23, pl. 2, fig. 4.

♂. *Genital armature* Text-fig. 2 ; *uncus* divided into two subtriangular lobes with blunt apices, separated by a very deeply curved anterior border of the tergite ; *subunci* long, slender, curved ; *tegumen* wide ; *vinculum* narrow, bearing a pointed *saccus* ; *valvae* oblong, with blunt apices; *penis* cylindrical, with a bulbous base, distal end slightly dilated and with an excised tip.

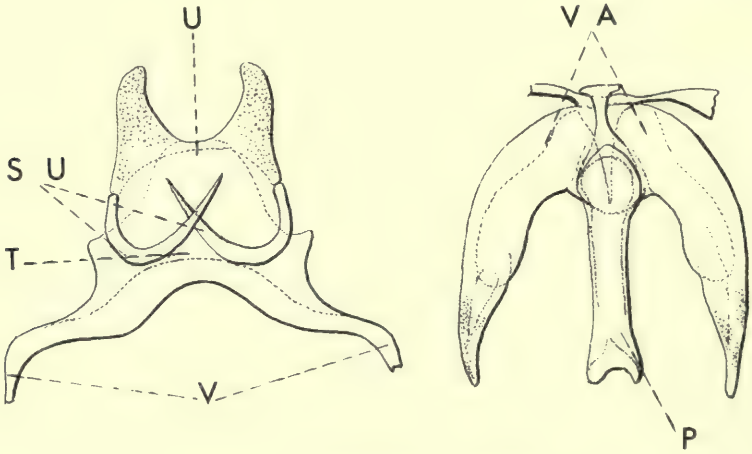

FIG. 2. *M. adelgitha* ♂, genitalia.

Distribution : NIGERIA, CAMEROONS, GABOON, REPUBLIC of CONGO, CONGO : Ituri.

Micropentila subplagata Baker

(Text-fig. 3)

Micropentila subplagata Baker, 1915 : 189.

♂. *Genital armature* Text-fig. 3 ; *uncus* and *subunci* very similar to those of *adelgitha* ; *tegumen* wide ; dorsal half of the *vinculum* also very wide, ventral half only moderately wide with a short, blunt *saccus* ; *valvae* narrow, slightly angled and with excised apices ; *penis* cylindrical, evenly curved.

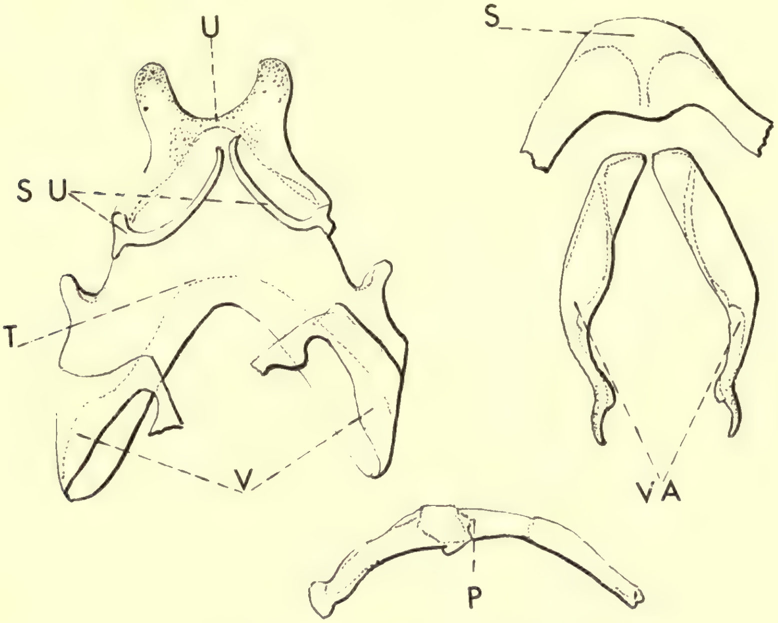

FIG. 3. *M. subplagata* ♂, genitalia.

Distribution : SOUTH CAMEROONS, Bitje, Ja Riv. (HT & AT.), UGANDA, Masaka, Katera (*T. H. E. Jackson*).

Micropentila souanke sp. n.

(Text-fig. 4, pl. 1, figs. 32, 33, ♂, 34, 35, ♀)

Darker and more heavily marked than *subplagata*.

♂. *Frons* black with two lateral fine white lines ; *palpi* above black, beneath white, without erected scales ; *antennae* ringed with black and white, club above black, beneath yellowish ; *legs* ringed with black and white.

Wings upperside : Forewing, intense black ; hindwing, black with a yellowish orange costal spot, smaller than in *subplagata*, its lower border following the lower margin of the cell, then along vein 4, then curving to join the marginal border near the extremity of vein 8. Fringes black.

Wings underside : blackish with striae and spots of vivid yellow. Forewing : a small stria in the middle of the cell, others between veins 4 and 7, outside the discoidals, between veins 9 and 7 ; anteterminal striae between veins 8 and 6, 6 and 5, 5 and 4, 4 and 3, 2 and 1 ; a narrow edging along the internal border. Hindwing : a spot at the rear of the costal border, one in the cell, one between veins 2 and 1B, one postdiscal, irregular, between veins 6 and 2, a small one on vein 1B ; an irregular submarginal stripe, interrupted between veins 4 and 3 ; some yellow scales along the abdominal border. Fringes black.

Size : forewing length, 10 mm., wings expanse, 19 mm.

♂. *Genital armature* : Text-fig. 4, near that of *subplagata*, but with stouter and shorter *subunci*.

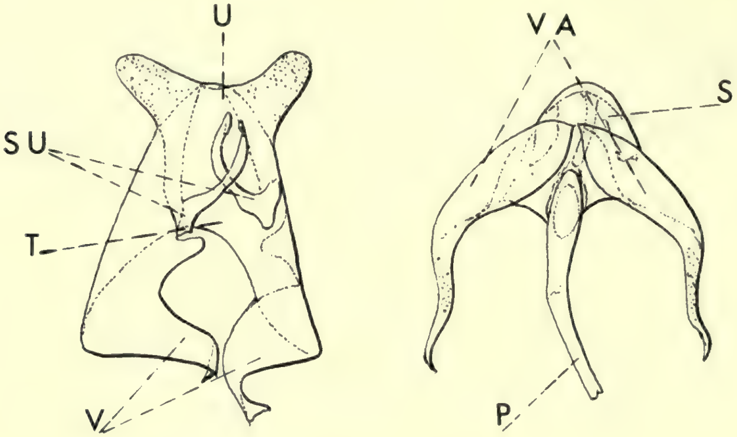

FIG. 4. *M. souanke* ♂, genitalia.

♀. *Frons*, *palpi*, *antennae* and *legs* as in ♂.

Wings upperside : yellow with a tinge of orange, with black markings as follows : Forewing : wide costal border, covering the cell ; apical patch and very wide marginal border, narrowed between vein 2 and the tornus. Hindwing : very wide marginal border, covering one-third of the wing, the internal margin irregular, enclosing a series of small submarginal dots. Fringes black with small white interruptions.

Wings underside : black with vivid yellow spots and striae. Forewing : Two small subcostal striae, one small stria in the middle of the cell, a large one outside the discoidals ; a wide irregular postdiscal fascia, running from vein 10 to vein 2, where it joins a wide stripe which edges the internal border ; an irregular series of anteterminal spots from vein 9 to vein 2, the spots between 9 and 6 more distant from the marginal border ; an irregular marginal series. Hindwing : Spot at the rear of the costal margin ; a subbasal stria ; a spot between 2 and 1B; a large irregular postdiscal spot between 6 and 3 ; irregular submarginal series ; some yellow scales along the abdominal border. Fringes as on the upperside.

Size : length of forewing 9·5 mm., wing expanse 18 mm.

Holotype ♂ : REPUBLIC OF CONGO, Souanke Sembe dist., Jan., 1960 (*T. H. E. Jackson*) B.M. Type No. Rh. 16883.

Allotype ♀ : same locality, March, 1960 (*T. H. E. Jackson*) B.M. Type No. Rh. 16884.

Section B

Micropentila fulvula Hawker Smith

(Text-fig. 5 ; pl. 1, figs. 36, 37, ♀ neallotype)

Micropentila fulvula Hawker Smith, 1933 : 9.

♂. *Genital armature* : Text-fig. 5, *uncus* deeply excised at the distal margin ; *subunci* short and stout, with an apophyse on the lower border ; *tegumen* oval ; *vinculum* narrow with a long *saccus* ; *valvae* rather long, the distal area deeply divided, the upper process wide and excised at the apex, the lower one long and very slender (the overall shape of the valvae reminiscent of some *Liptena* of the *opaca* group). *Penis* long, slightly expanded internally, strongly curved externally and a little dilated at the tip.

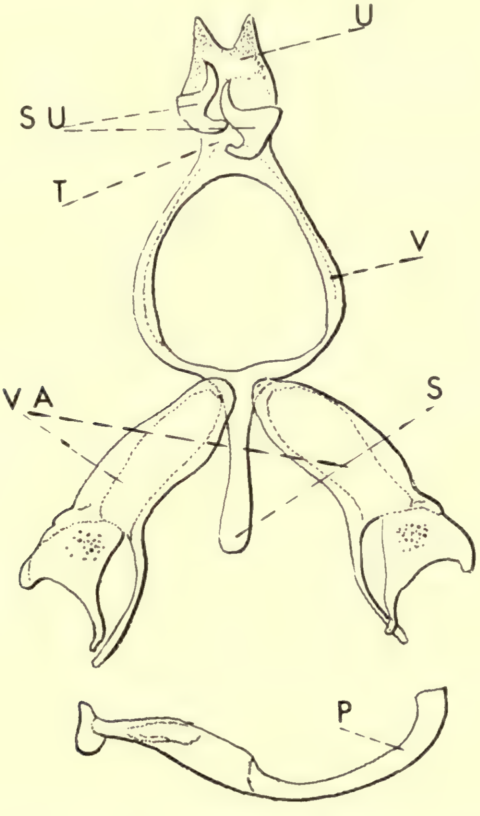

Fig. 5. *M. fulvula* ♂, genitalia.

♀. (Not previously described.) Only differs from the ♂ in the slightly paler fulvous tint of the upperside and in the absence of the discoidal mark on the hindwing.

Neallotype ♀ : Republic of Congo, Souanke Sembe dist., Feb., 1960 (*T. H. E. Jackson*) B. M. Type No. Rh. 16885.

Section C

Micropentila adelgunda (Staudinger)

(Text-fig. 6 ; pl. 1, figs. 38, 39, ♂ holotype)

Teriomima adelgunda Staudinger, 1891 : 219.

♂. *Genital armature* : Text-fig. 6, *uncus* with lateral margins slightly concave, anterior border rather more deeply concave ; *subunci* stout, bent ; *vinculum* fairly narrow, with a wide *saccus* terminating in a broad, inwardly directed crescent ; *penis* with a small *fultura inferior* which projects from the right-angled base, then straight until the distal extremity, which is coiled and dilated ; *valvae* oblong, the lower margin excised near the apex.

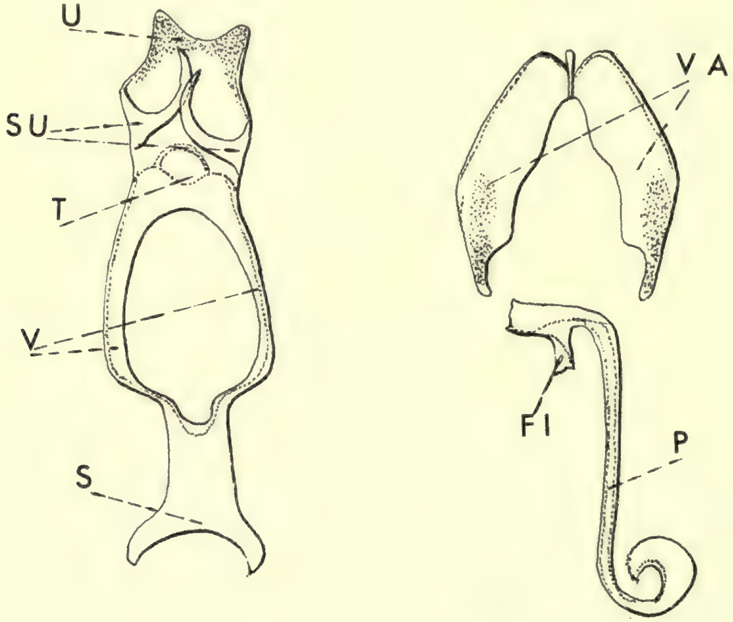

FIG. 6. *M. adelgunda* ♂, genitalia.

The ♀ appears to be unknown ; however, the figure in Seitz, plate 62E, has the white spots of the upperside forewing larger than in the holotype ♂—it may be a ♀!

Habitat : CAMEROONS, Johann Albrechts Höhe, Barombi Station (holotype), other specimens in B.M. (N.H.) from this locality.

In Seitz : 340, Aurivillius quotes " from Cameroons to Ogowe " but his specimens from Gaboon may belong to *gabunica* sp. n.

***Micropentila bitjeana* sp. n.**

(Text-fig. 7 ; pl. 1, figs. 40, 41, ♂ holotype)

♂. Very similar to *M. adelgunda* in facies, but readily separated from that species by the genital armature.

♂. *Genital armature* : Text-fig. 7, *uncus* with the anterior margin less concave than in *adelgunda*, lateral margins straighter ; *subunci* longer and comparatively slender ; *saccus* completely different, being a simple elongate triangle ; *valvae* broader and more rounded.

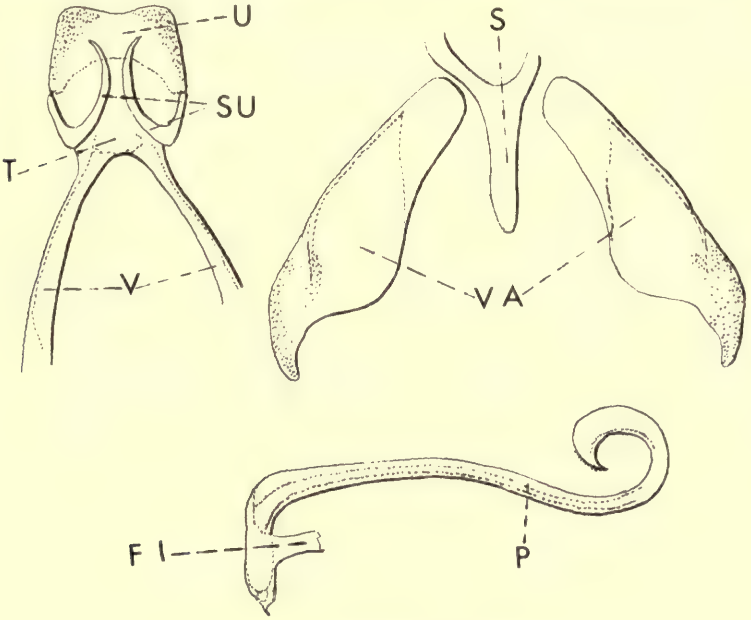

FIG. 7. *M. bitjeana* ♂, genitalia.

Size : forewing length 14 mm., wings expanse 26 mm.
♀. Unknown.

Holotype ♂ : S. CAMEROONS, Bitje, Ja River. B.M. Type No. Rh. 16886.

***Micropentila dorothea* Baker**

(Text-fig. 8 ; pl. 1, figs. 42, 43, ♀ neallotype)

Micropentila dorothea Baker, 1903 : 327.

♂. *Genital armature* : Text-fig. 8, anterior border of the *uncus* hollowed in a regular curve, lateral borders slightly concave ; *subunci* long, angled near base ; *tegumen* broad ; *vinculum* narrow, with an elaborate *saccus* which is of similar type to that of *adelgunda* ; *fultura inferior* encircling the base of the *penis*, which is typical of the species of this section ; *valvae* oblong, divided in the distal area into two very unequal lobes.

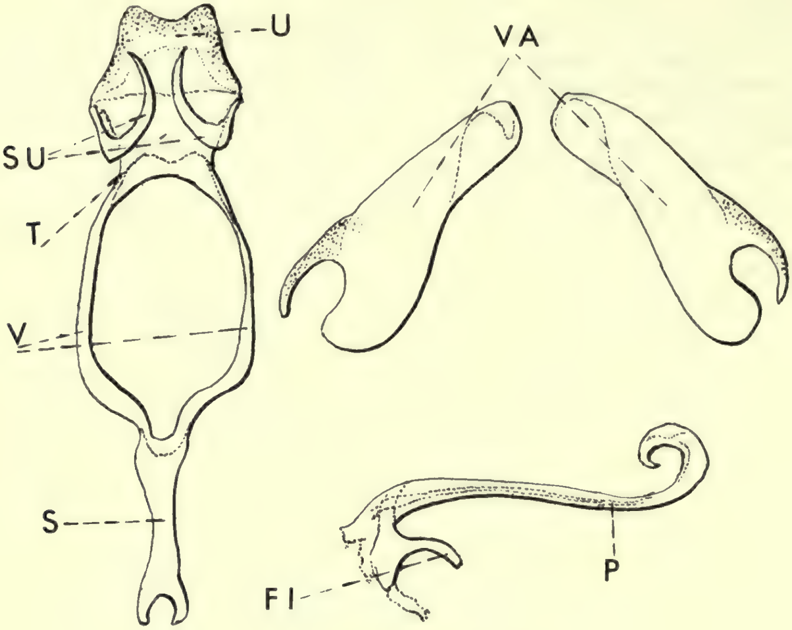

FIG. 8. *M. dorothea* ♂, genitalia.

♀. (Not previously described.) Differs from ♂ as follows :—

Wings upperside : the dots of the forewing are yellowish-white instead of white, and appreciably larger. (In one specimen from Nigeria, Obubia, Ogoja, there is an extra yellowish dot between 6 and 5 and the anteterminal spot extends from 5 to 2, the whole forming a nearly continuous fascia.)

Wings underside : all the light-coloured designs are enlarged and slightly yellowish.
Size : forewing length 12–13 mm., wings expanse 22–25 mm.

Neallotype ♀ : SIERRA LEONE, Moyamba, 7.Feb.03, ex Cator coll., B.M. Type No. Rh. 16887.

Habitat : SIERRA LEONE, Moyamba ; Fulu Wusu ; Kholifa ; IVORY COAST ; GHANA, Ho ; Kpandu ; Odumasi Swamp ; Coomassie ; NORTHERN NIGERIA, Bassa Prov. ; SOUTHERN NIGERIA, Ogoja ; Ikom ; Obubia ; Afikpo-Onitsha ; Udi ; Awka Mamu Forest ; Behin ; Ubiaja ; WEST CAMEROONS, Mamfe.

Micropentila gabunica **sp. n.**

(Text-fig. 9 ; pl. 1, figs. 44, 45, ♂ ; 46, 47, ♀)

Closely akin to *dorothea*, but may be separated therefrom by the following characters :—

♂. *Upperside forewing* with smaller white dots. *Upperside hindwing* the white dots are either wholly absent or reduced to near invisibility. *Underside* : white dots arranged as in *dorothea*, but somewhat smaller.

Size : 22–25 mm. (*dorothea* 25 mm.)

♂. *Genital armature* : Text-fig. 9, distal portion of the *valvae* different from that of *dorothea*, the extremity of the upper lobe longer and strongly curved, that of the lower lobe wider and more rounded.

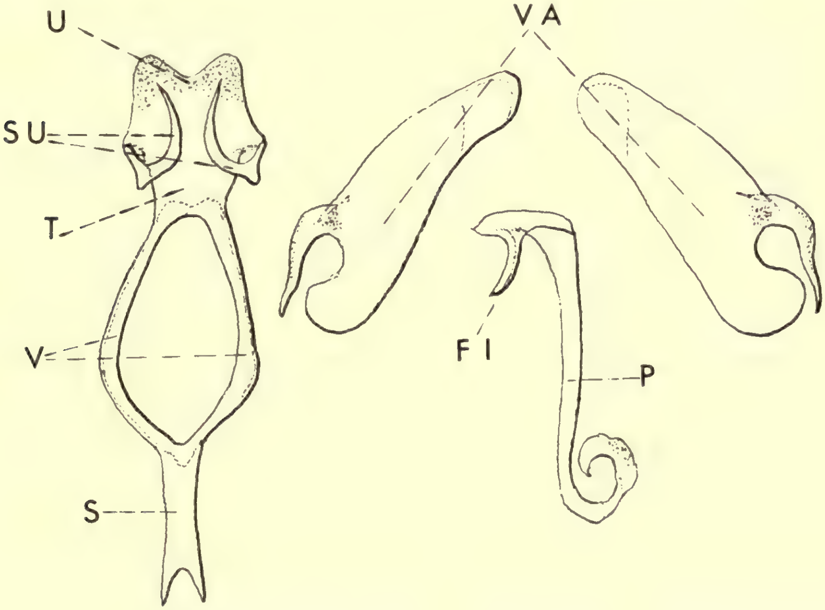

FIG. 9. *M. gabunica* ♂, genitalia.

♀. As in ♂, the white spots and blotches are smaller than in *dorothea*.

Size : 22–23 mm. (*dorothea* 23–25 mm.).

Holotype ♂ : GABOON, B.M. Type No. Rh. 16888.

Allotype ♀ : GABOON, B.M. Type No. Rh. 16889.

Paratypes : 1 ♂, Gaboon, 1 ♂, Lake Asebe, Fernan Vaz, ex coll. Rothschild, both in B.M. (N.H.) collection ; 1 ♂, Bas Ogove, Ngomo, in Mus. Paris collection ; 1 ♀, ex Godman-Salvin coll. ; 1 ♀ without locality, ex Joicey coll., both in B.M. (N.H.) coll.

Section D

Micropentila brunnea (Kirby)

(Text-fig. 10)

Lucia (?) *brunnea* Kirby, 1887 : 368.
Micropentila brunnea (Kirby) Aurivillius, 1920, in Seitz **13** : 340, figs. 64B.

The type is a ♂ without precise locality (West Africa), genitalia preparation, slide 2353.

Hindwing underside : the postdiscal band is moderately broad and of pale yellowish-grey coloration (but the specimen is old).

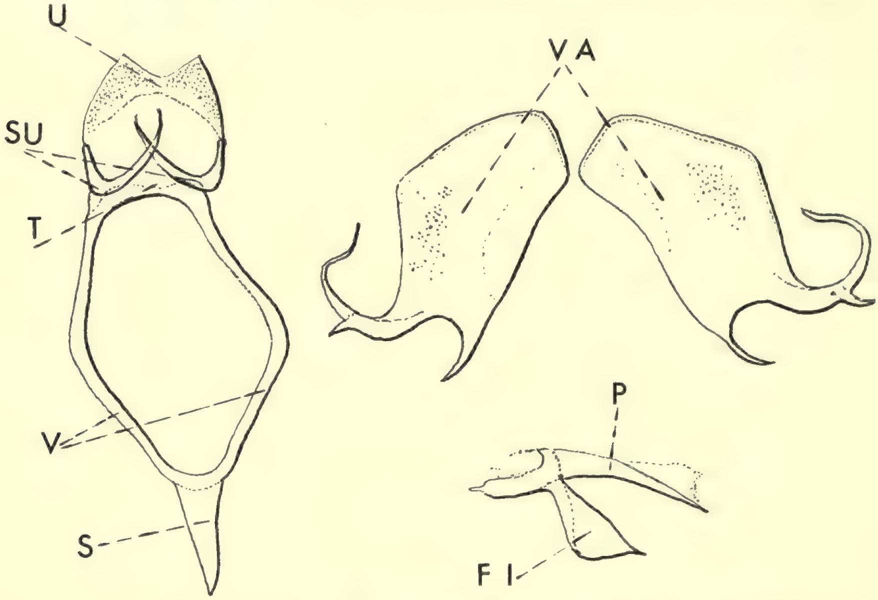

FIG. 10. *M. brunnea* ♂, genitalia.

♀. *Upperside* : the postdiscal yellow band complete on both wings, on the forewing narrow towards the costa, broad at the middle ; on the hindwing rather narrow. *Underside* : postdiscal band complete on both wings, wider and more yellowish than in ♂.

Distribution : Typical race, SIERRA LEONE, Moyamba ; LIBERIA ; IVORY COAST ; S. NIGERIA, Oban ; Calabar, Aningejo ; WEST CAMEROONS, Bitje ; Mamfe; GABOON ; CONGO, Beni, Ituri (one example).

NIGERIA, Ikom, a race possibly worthy of a name ?

♂. *Underside* : postdiscal band of hindwing more yellow.
♀. *Upperside* : hindwing postdiscal band much wider and vivid yellow.
♀. *Underside* : postdiscal band wide and yellow.

S. NIGERIA, Ogoja, Ikom ; Onitsha, Awke Mamu Forest ; W. CAMEROONS, Kumbe ; FERNANDO PO.

MIDDLE CONGO race.

♀. *Upperside* : forewing postdiscal yellow band more or less suffused with grey.
♀. *Underside* : like the Ikom race.

Micropentila victoriae sp. n.

(Text-fig. 11 ; pl. 1, figs. 48, 49, ♂, 50, 51, ♀)

Differs from *brunnea* as follows :

♂. *Underside* : hindwing postdiscal band greyish white, almost linear.

♀. *Upperside* : forewing postdiscal band completely suffused with faintly yellowish grey ; hindwing band yellow, of medium breadth.

♀. *Underside* : hindwing postdiscal band of medium breadth, pale yellow.

♂. *Genital armature* : no constant difference has been discovered between this species and *brunnea*.

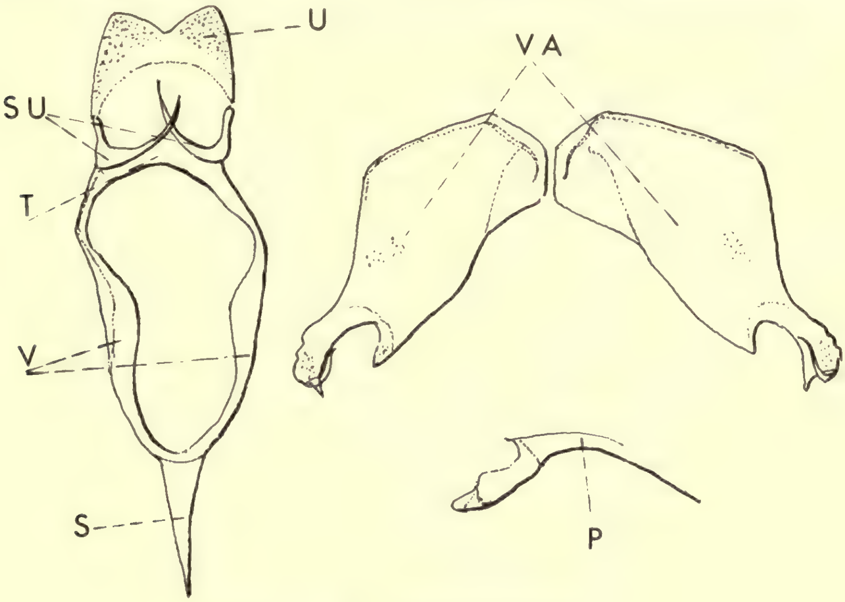

FIG. 11. *M. victoriae* ♂, genitalia.

Size : appreciably larger than *brunnea*.

Holotype ♂ : UGANDA, Mpigi, Mpanga Forest (*T. H. E. Jackson*) B.M. Type No. Rh. 16890.

Allotype ♀ : same locality, August, 1961 (*T. H. E. Jackson*) B.M. Type No. Rh. 16891.

Paratypes : 6 ♂, 4 ♀, same locality (*T. H. E. Jackson*), in Stempffer collection. 1 ♂, 3 ♀, UGANDA, Masaka, Katera (*T. H. E. Jackson*) in B.M. (N.H.) collection. 2 ♂, same locality, in Stempffer collection. 1 ♂, 2 ♀, UGANDA, Unyoro, Budongo Forest (*T. H. E. Jackson*) in B.M. (N.H.) collection. 1 ♂, same locality, in Stempffer collection. 1 ♂, UGANDA, Sesse Islands, Bugalla (*T. H. E. Jackson*) in Stempffer collection. 1 ♀, UGANDA, Toro, Mpanga Forest, 4,800′ (*S. A. Neave*) in B.M. (N.H.) collection. 2 ♂, 1 ♀, CONGO, Beni, Ituri, 4,000′ (*T. H. E. Jackson*) in B.M. (N.H.) collection.

Micropentila katerae sp. n.

(Text-fig. 12 ; pl. 1, figs. 52, 53, ♂, 54, 55, ♀)

♂. Differs from *brunnea* as follows : *Upperside forewing* : the middle dark area of the wing is limited on the inner side by a thin, greyish-white line, on the outer side by a greyish-white postdiscal line, so the whole wing appears to be divided into three zones. *Underside forewing* : there is a weak trace of a subbasal transverse line resembling that of the upperside ; postdiscal and anteterminal lines as in *brunnea*, in addition there is a subapical greyish-white dot between the anteterminal line and the outer border. *Underside hindwing* : Postdiscal stripe greyish-white instead of yellowish or yellow, with rather diffuse borders. These characters are constant in the three males examined.

Size : length of forewing 12·5 mm., wing expanse 23 mm.

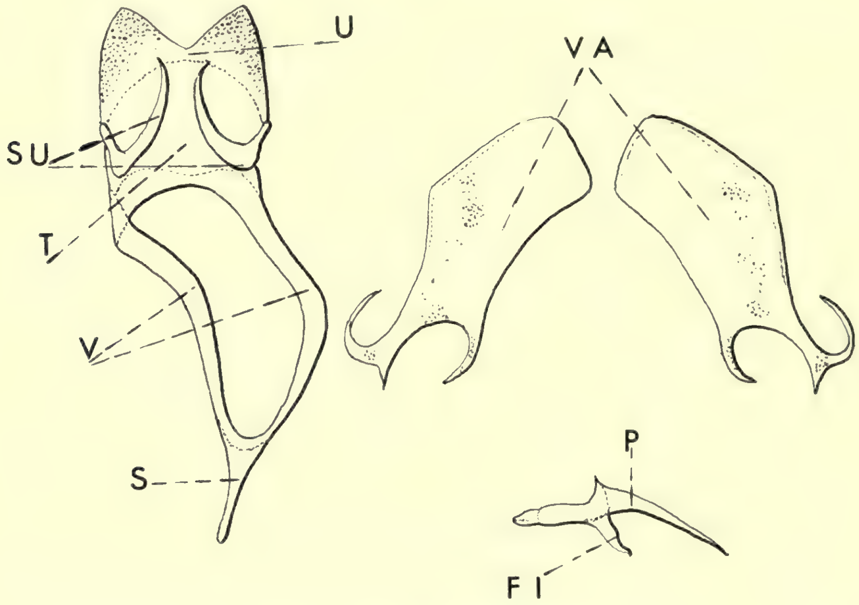

FIG. 12. *M. katerae* ♂, genitalia.

♂. *Genital armature* : Text-fig. 12, similar to that of *brunnea*.

♀. Upperside of both wings has postdiscal bands narrower and yellowish-white instead of pure, vivid yellow. *Underside* : as in ♂, the postdiscal band is narrower than in *brunnea*, slightly greyish-white instead of yellow, with a small greyish-white subapical spot on the forewing.

Size : length of forewing 11 mm., wing expanse 21 mm.

Holotype ♂ : UGANDA, Masaka, Sango Bay, Katera (*T. H. E. Jackson*) B.M. Type No. Rh. 16892.

Allotype ♀ : same locality (*T. H. E. Jackson*) B.M. Type No. Rh. 16893.

Form ? UGANDA, Kigezi.

(Text-fig. 13, pl. 2, figs. 56, 57, ♂)

A ♂ from the above locality was at first thought by the authors to be the then unknown ♂ of *ugandae* Hawker Smith. This view was altered by evidence submitted by T. H. E. Jackson and genitalic details confirmed that this specimen is, in fact, a member of the *brunnea*-group. It is separable from the other species in the following details :

♂. *Genital armature* : Text-fig. 13, close to the armatures of *brunnea* and *katerae,* but the main part of the *valva* is longer and the distal end of the main process is digitate, very long and slender.

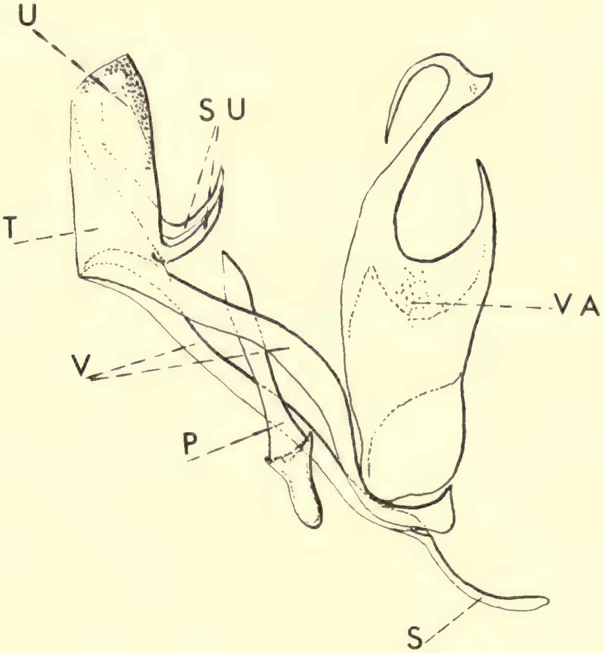

FIG. 13. Form ?, Uganda, Kigezi, ♂, genitalia.

We await the receipt of further material before naming this form.

Form ? UGANDA, Bwamba.

(Text-fig. 14)

Differs from the form described above in facies, but the genital armature is in many respects similar. The *valva* is broad, with angular upper borders, the terminal part of the main process digitate but a little shorter than in the preceeding form.

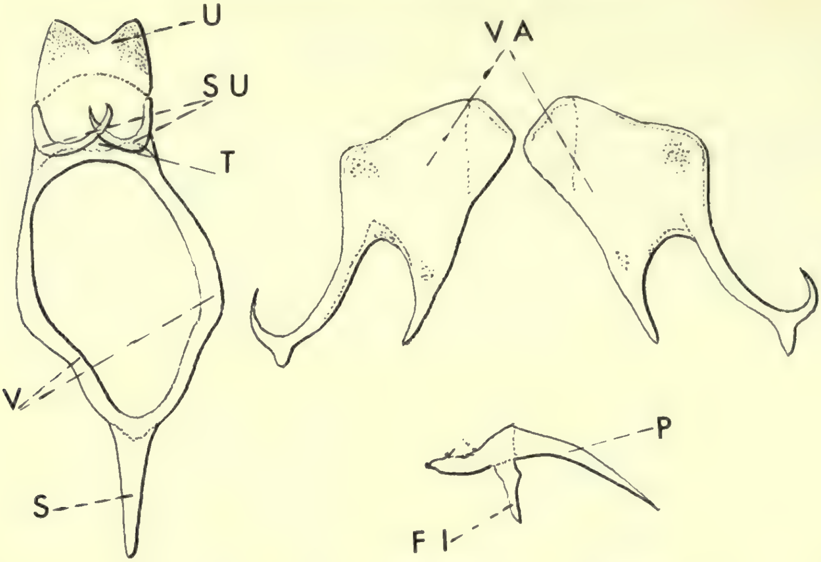

FIG. 14. Form ?, Uganda, Bwamba, ♂, genitalia.

It is felt better to leave the description of this form until further material becomes available.

Micropentila flavopunctata sp. n.

(Text-fig. 15 ; pl. 2, figs. 58, 59, ♂, 60, 61, ♀)

Differs from *brunnea* in the following characters :

♂. *Upperside hindwing* : the yellow patch on the abdominal border, situated at the end of the postdiscal line, is decidedly larger than in *brunnea*. *Underside*: forewing, the postdiscal

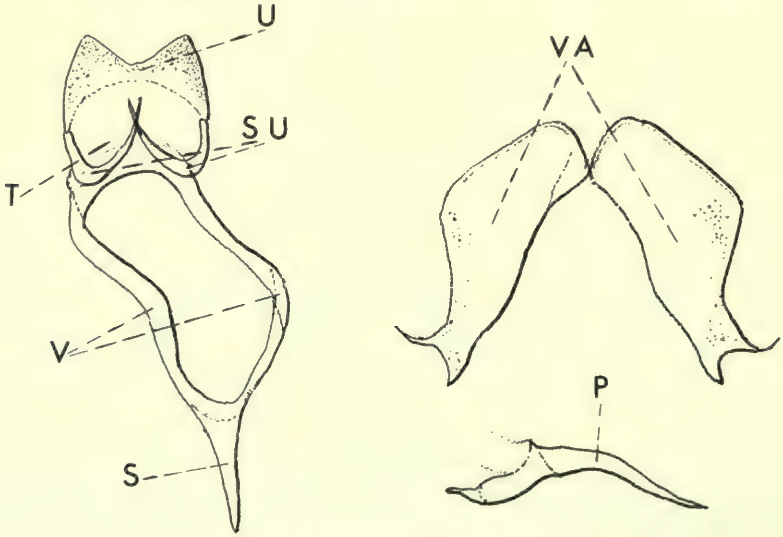

FIG. 15. *M. flavopunctata* ♂, genitalia.

and anteterminal lines, nearly obsolete in the type from Bitje, are more clearly defined in the two paratypes from Ikom. Hindwing : postdiscal band of medium width, pale yellow ; indistinct submarginal lunules.

♂. *Genital armature* : Text-fig. 15, the apex of the *valva* is not so deeply excised, the end of the upper process being shorter and more robust, bearing no tooth ; the end of the lower process is triangular, not digitate.

♀. *Upperside forewing* : postdiscal band narrow, slightly suffused with grey. *Upperside hindwing* : postdiscal band wide, yellow, complete from costal to abdominal border. *Underside forewing* : postdiscal band pale yellow, more distinct than on the upperside ; anteterminal and submarginal series of little white interneural striae. *Underside hindwing* : postdiscal band pale yellow, a wide anteterminal and submarginal series of striae as in the forewing.

Holotype ♂ and allotype ♀ : S. CAMEROONS, Bitje, Ja River, B.M. Type Nos. Rh. 16895, 16896.

Paratypes : 2 ♂, S. NIGERIA, Ogoja, Ikom, March, 1956 (*T. H. E. Jackson*) in Stempffer collection.

Micropentila jacksoni Talbot

(Text-fig. 16)

Micropentila jacksoni Talbot, 1937 : 61, pl. 1, fig. 17 ♂, fig. 14, ♀.

♂. *Genital armature* : differs slightly from that of *brunnea* the apex of the *valva* is more slender and somewhat shorter.

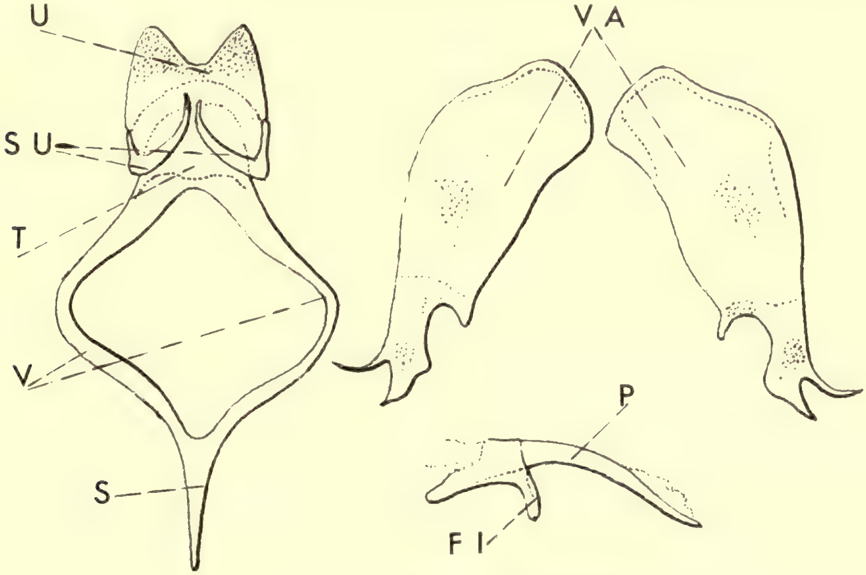

FIG. 16. *M. jacksoni* ♂, genitalia.

Habitat : UGANDA, Masaka, Katera.

Micropentila bakotae sp. n.

(Text-fig. 17 ; pl. 2, figs. 62, 63, ♂, 64, 65, ♀)

♂. *Frons* covered with black hair ; second joint of *palpi* furnished on the underside with long, erect hair ; *antennal shaft* ringed with black and white, *club* black with a small area of the tip orange.

Wings upperside : blackish brown, both wings with a very thin greyish postdiscal line which is, at the abdominal border, faintly tinged with yellow. Fringes blackish.

Wings underside : blackish. Forewing with a thin whitish postdiscal line, more distinct in the costal zone, then interrupted ; an anteterminal line of interneural whitish striae ; between this line and the outer margin a small subapical white dot. Hindwing : a thin whitish postdiscal line, curved, a little wider towards the costa ; anteterminal and submarginal series of small whitish crescents. Fringes as on upperside.

♂. *Genital armature* : Text-fig. 17, closely resembling those of the other species of this group.

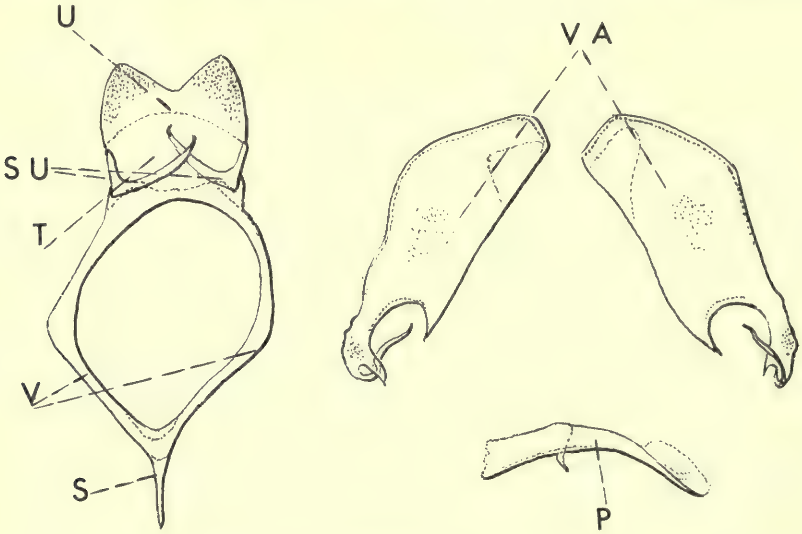

FIG. 17. *M. bakotae* ♂, genitalia.

Size : length of forewing, 11·5 mm., wings expanse, 21 mm.

♀. Very similar to ♂ on both upper and undersides, but without any trace of the yellow postdiscal band ; this feature is very noticeable, for it is unique in the *brunnea* group.

Size : length of forewing, 11·5 mm., wings expanse, 21 mm.

Holotype ♂ and allotype ♀ : REPUBLIC OF CONGO, Sembe, Souanke, January, 1960 (*T. H. E. Jackson*). B.M. Type Nos. Rh. 16897, 16898.

Paratypes : 4 ♂, same locality, Jan.-Feb., 1960 (*T. H. E. Jackson*) ; 1 ♂, Etoumbi, March, 1959 (*T. H. E. Jackson*) ; 3 ♂, Ouesso, Ketta Forest, Dec. 1959 and April, 1960 (*T. H. E. Jackson*), all in B.M. (N.H.) collection. 3 ♂, 1 ♀, Ouesso, Ketta Forest, Dec. 1959 (*T. H. E. Jackson*), in Stempffer collection.

Micropentila nigeriana sp. n.

(Text-fig. 18 ; pl. 2, figs. 66, 67, ♂, 68, 69, ♀)

♂. *Wings upperside.* Forewing : black, with a very thin, almost invisible whitish postdiscal line. Hindwing : black, with a wide yellow stripe extending from the abdominal border up to vein 6.

Wings underside. Forewing : black, with two very small yellow dots in the cell ; postdiscal line pale yellow, interrupted between veins 4 and 6 in the holotype and in the paratype from Ikom, continuous in the paratype from Oshodi ; a fine yellow submarginal line, interrupted by the veins. Hindwing : black, with a variable number of small yellowish subbasal dots ; the postdiscal stripe yellowish from the costa to 1b, narrowed between the costa and vein 6 in the holotype and in the Ikom paratype, less so in the Oshodi example ; a series of yellowish-white submarginal lunules.

♂. *Genital armature* : Text-fig. 18, *uncus* deeply excised at the anterior border ; *subunci* very thick around the median region, then thin with an acute extremity ; *valvae* oblong, with blunt apices, the border of the upper process in each case angled about midway ; *penis* long, strongly curved, with an acute terminal portion.

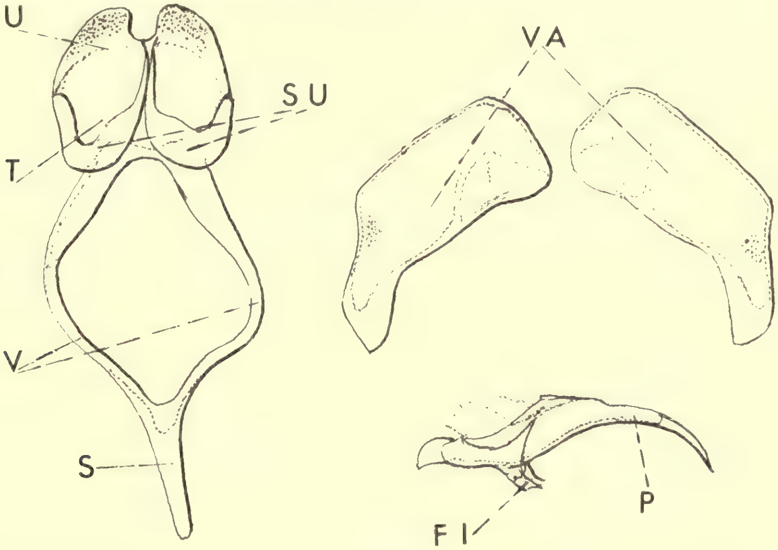

FIG. 18. *M. nigeriana* ♂, genitalia.

♀. *Wings upperside.* Forewing : black, with small dots in the cell, postdiscal stripe vivid yellow, narrow towards the costa, wide towards the inner border. Hindwing : vivid yellow postdiscal stripe, wider than in ♂, from the abdominal border up to the costa.

Wings underside. Forewing : three little yellow dots in the cell ; postdiscal stripe as on the upperside ; yellowish anteterminal striae ; yellowish submarginal line. Hindwing : yellowish subbasal dots ; wide postdiscal stripe as on the upperside ; anteterminal series of yellowish striae ; yellowish submarginal lunules.

Size : ♂, length of forewing, 12 mm., wings expanse, 20·5 mm. ♀, length of forewing, 10·5 mm., wings expanse, 20 mm.

Holotype ♂, NIGERIA, Calabar, Oban, Feb. 1921, B.M. Type No. Rh. 16899.

Allotype ♀ : same locality, Jan. 1921, B.M. Type No. Rh. 16900. Both ex Cator coll.

Paratypes : Nigeria, 1 ♂, Lagos, Oshodi, April 1955 (*T. H. E. Jackson*), 1 ♂, Ogoja, Ikom, Feb. 1956 (*T. H. E. Jackson*) ; 1 ♀, Ghana, Ashanti, Obuassi, end of wet season, 1902 (*G. E. Bergman*) ; 1 ♀, Nigeria, Ogoja, Ikom, March 1957 (*T. H. E. Jackson*) ; all in B.M. (N.H.) coll.

***Micropentila mpigi* sp. n.**

(Text-fig. 19 ; pl. 2, figs. 70, 71, ♂, 72, 73, ♀)

Differs from *nigeriana* as follows :

♂. *Wings underside.* Forewing : only one little white dot in the cell, almost invisible ; postdiscal line whitish instead of yellowish. Hindwing : postdiscal stripe white instead of yellowish.

♂. *Genital armature* : Text-fig. 19, *subunci* slender, not dilated in the middle region ; *valvae*, the border of the upper process evenly curved, not angled ; *penis* less strongly curved.

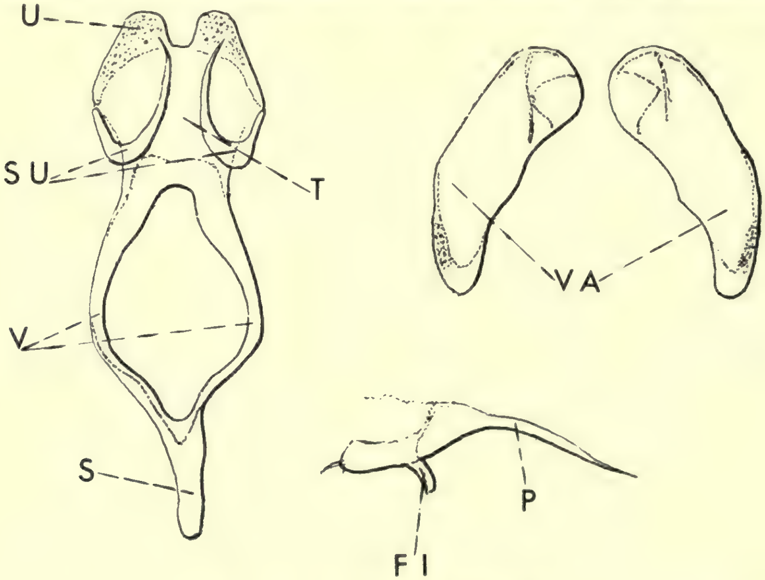

Fig. 19. *M. mpigi* ♂, genitalia.

♀. *Underside forewing* : only a very small dot in the cell ; postdiscal stripe pale yellow. *Underside hindwing* : postdiscal stripe creamy white. In one ♀ paratype the postdiscal stripe of the forewing upperside is linear from the costa to vein 7, interrupted from 7 to 5, then moderately wide from 5 to the inner border.

Size : ♂ and ♀, length of forewing, 11·5 mm., wings expanse 22 mm. (so appreciably larger than *nigeriana*).

Holotype ♂ and allotype ♀ : Uganda, Mpigi, Mpanga Forest (*T. H. E. Jackson*) B.M. Type Nos. Rh. 16901, 16902.

Paratypes : 8 ♂, 2 ♀, same locality, Sept.-Oct. 1959 (*T. H. E. Jackson*), in Stempffer collection.

Micropentila fontainei sp. n.

(Text-fig. 20 ; pl. 2, figs. 74, 75, ♂, 76, 77, ♀)

(Dedicated to Dr. M. Fontaine).

♂. *Frons* covered with black hair, a white line between the eyes ; *palpi* furnished on the underside with white and black scales ; shaft of the *antennae* ringed with black and white, club black with orange at the tip.

Wings upperside black, with pattern as follows : forewing : a small white dot a little before the end of the cell, another dot below the origin of vein 2 ; a postdiscal series of three small white dots, one below the origin of vein 9, one between 7 and 6, one between 4 and 3. Hindwing: a yellow postdiscal stripe, 2·5 to 3 mm. wide, extending from the abdominal border up to vein 6 ; this stripe is extended along the abdominal border nearly up to the base of the wing, and reduced in width at this point to 1·5 mm. Fringes black, weakly checkered with white.

Wings underside blackish brown with pattern as follows : forewing : small, indistinct white dots along the costa ; a dot in the cell as on the upperside ; a postdiscal series of small white dots between the veins from the costa to vein 3 ; an anteterminal series of white dots, indistinct, from the costa to vein 5 ; a submarginal series of indistinct white dots from the apex to vein 3 ; a whitish grey area along the inner border. Hindwing : basal series of four white dots ; a subbasal series of four white dots ; a postdiscal design made up of a white costal patch between the costa and vein 7 and of a very irregular stripe which is either creamy white or pale yellow ; this stripe is wide between veins 6 and 2, narrow between 2 and the abdominal border ; an anteterminal series of indistinct whitish striae ; a marginal series of two whitish patches between 7 and 6, 6 and 5 and of little interneural striae from vein 5 to the anal angle. Fringes as on upperside.

Size : length of forewing, 12 mm., wings expanse, 22 mm.

♂. *Genital armature* : Text-fig. 20 ; *uncus* crescent shaped, only weakly excised at the top ; *subunci* bent, slender ; *tegumen* moderately wide ; *vinculum* narrow with a long triangular *saccus* ; *valvae* oblong, the lower border excised before the rounded apex ; *penis* long, weakly curved, with a sharp extremity.

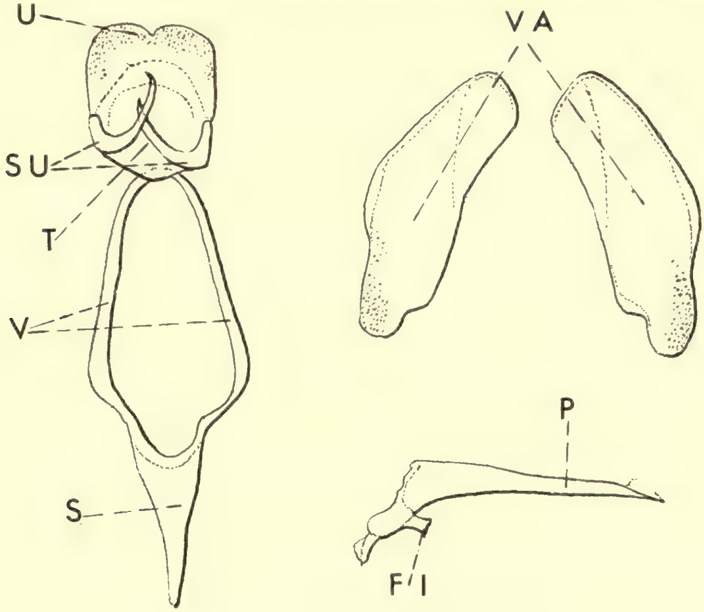

FIG. 20. *M. fontainei* ♂, genitalia.

♀. Differs from ♂ in the following characters : *Upperside forewing* : two yellowish dots in the cell ; postdiscal series of three yellow dots, confluent, between the costa and vein 6, and of a large, irregular yellow patch between veins 5 and 3. *Hindwing* : the postdiscal stripe a little wider.

Underside forewing : two yellow dots in the cell ; postdiscal series continuous, formed of three little yellow patches between the costa and vein 6, one stria between 6 and 5 and of a large irregular patch between 5 and 2. *Hindwing* : as in ♂, but the basal, subbasal, anteterminal and submarginal dots are larger and more distinct, the postdiscal stripe wider.

Size : length of forewing, 12·5 mm., wings expanse, 23 mm.

Holotype ♂ : CONGO, Sankuru, Katako Kombe, 2nd July, 1952 (*Dr. M. Fontaine*).

Allotype ♀ : same locality, 5th January, 1953 (*Dr. M. Fontaine*). Both in Musée royal de l'Afrique centrale, Tervuren.

Paratypes : 1 ♂, same locality, 15th February, 1953 (*Dr. M. Fontaine*), in Stempffer collection. 1 ♂, UGANDA, Bwamba, March, 1958 (*R. Carcasson*), in Coryndon Museum, Nairobi ; 2 ♀, same locality, April, 1942 and March, 1959 (*T. H. E. Jackson*), in B.M. (N.H.) collection.

Micropentila fuscula (Grose Smith)

(Text-fig. 21 ; pl. 2, figs. 78, 79, neallotype ♂)

Teriomima fuscula Grose Smith, 1898 : 355.

Neallotype ♂. *Frons* clad with blackish brown hair ; second joint of *palpus* laterally compressed. clothed on the underside with erect brown and white scales ; *antennal shaft* ringed with black and white, club black, tipped with orange.

Upperside forewing : lustrous rich brown, sparsely ornamented with creamy white dots as follows : a small clearly defined dot in the outer end of the cell ; a postdiscal band consisting of one very small dot on the costa, closely associated with two somewhat larger interneural spots ; another spot, twice as large as the preceding, in space 4. *Hindwing*: ground colour as in the forewing, the inner margin creamy white, a fine yellow postdiscal band of interneural striae extending in a straight line towards the outer margin.

Underside forewing : ground colour paler brown than the upperside with numerous yellow spots in the costal, apical and outer margins, a yellowish band extending the full length of the hindmargin. *Hindwing* : ground colour slightly paler than the forewing underside, heavily spotted and blotched with yellowish white, the most conspicuous marking being the postdiscal band, in which several large spots coalesce to form a band more than one half the width of the wing.

Size : length of forewing 12·5 mm., wings expanse 24 mm.

♂. *Genital armature* : Text-fig. 21, very similar to that of *fontainei*, the upper border of the *uncus* rather more widely excised, the *penis* more acutely bent.

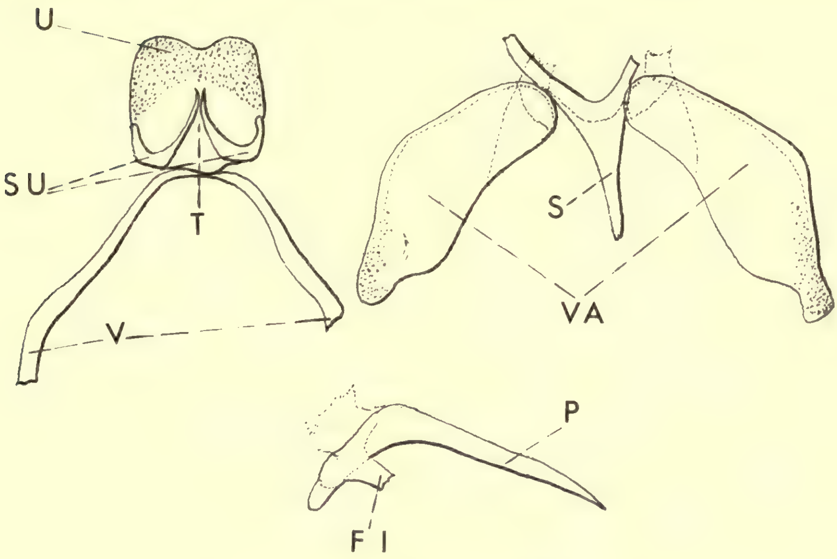

FIG. 21. *M. fuscula* ♂, genitalia.

Habitat : NIGERIA, Warri (holotype ♀) ; Ogoja, Ikom (neallotype ♂), B.M. Type No. Rh. 16903 ; both in the B. M. (N.H.) collection.

Micropentila ogojae sp. n.

(Text-fig. 22 ; pl. 3, figs. 80, 81, ♂ HT)

♂. *Frons* furnished with long black hair ; shaft of *antenna* ringed with white.

Upperside forewing : black, without pattern or spotting. *Hindwing* : black, with a triangular orange yellow patch with a base extending over one-half of the abdominal border, nearly reaching the anal angle, the peak of the triangle reaching vein 3. Fringes black, lightly checkered with white.

Underside forewing : blackish brown, with minute indistinct dots between 9 and 8, 8 and 7, 7 and 6. *Hindwing* : blackish brown, with very small orange yellow dots between veins 6 and 5, 5 and 4, 2 and 1b ; a faint trace of a complete anteterminal series of the same colour. Fringes as on the upperside.

Size : length of forewing, 13 mm., wings expanse, 25 mm.

♂. *Genital armature* : *uncus* composed of two semicircular lobes separated by a little rounded depression ; *subunci* long, curved, tapering evenly ; *tegumen* wide ; *vinculum* moderately wide with a triangular *saccus* ; *valvae* long, subtriangular, with pointed apices ; *penis* of small size, slightly bent.

♀. Unknown.

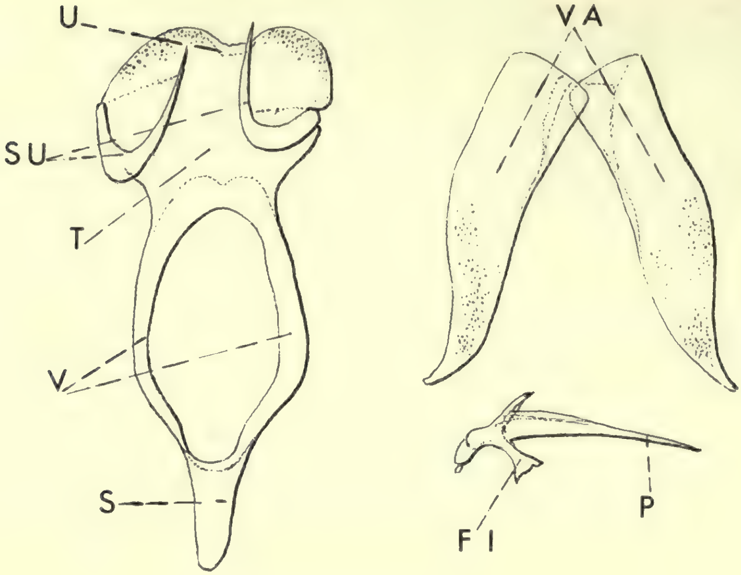

FIG. 22. *M. ogojae* ♂, genitalia.

Holotype ♂ : NIGERIA, Ogoja, Ikom, June, 1957 (*T. H. E. Jackson*) B.M. Type No. Rh. 16904.

Paratypes : 2 ♂, REPUBLIC OF CONGO, Kelle, Feb. 1963 (*T. H. E. Jackson*) in B.M. (N.H.) collection.

Micropentila kelleana **sp. n.**

(Text-fig. 23 ; pl. 3, figs. 82, 83, ♂, 84, 85, ♀)

Differs from *ogojae* in the shape of the orange patch of the upperside hindwing of ♂.

♂. *Upperside forewing* : blackish brown, without markings. *Hindwing* : blackish brown with a roughly oval patch of orange yellow running alongside the abdominal margin.

Underside forewing : blackish brown, with two faint sordid markings on the costa, approaching the apex. A paler zone lying between the hind margin and the first vein. *Hindwing* : blackish brown, with a clearly marked, yellowish white, triangular costal marking ; an ochreous suffusion on the inner margin. Close inspection shows also a very faintly indicated series of submarginal greyish lunules, also a very obscure spot of greyish white at the end of the cell. These marks would no doubt be more apparent in an absolutely fresh specimen.

♂. *Genital armature* : the *uncus* trapezoidal, the *subunci* shorter and more angled than in *ogojae*.

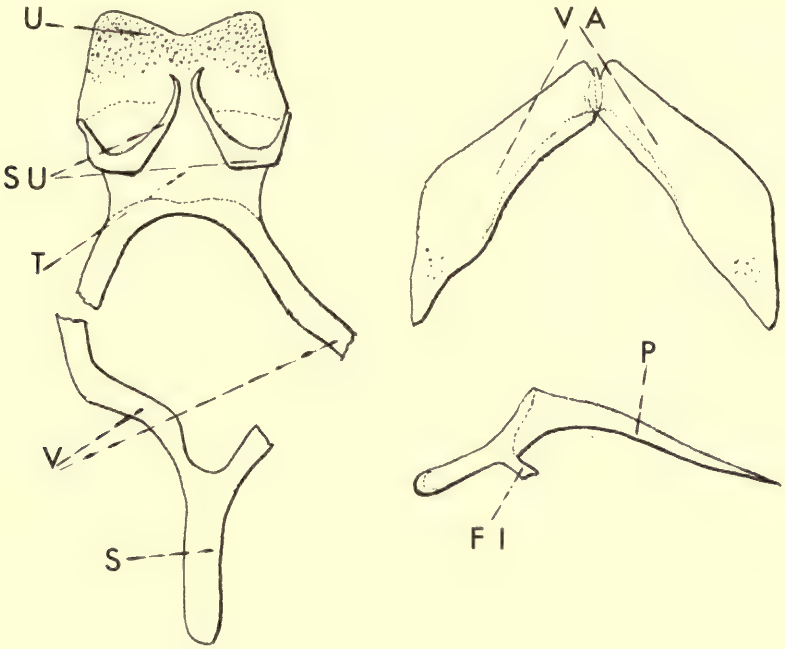

FIG. 23. *M. kelleana* ♂, genitalia.

♀. *Upperside forewing* : ground colour blackish brown, the most conspicuous marking being a broad orange band based on the hind margin and terminating in a tapered point near the end of the cell ; there is also a small costal spot of the same colour at about two-thirds from the base of the wing. *Hindwing* : ground colour as in the forewing, bisected by an orange yellow band, wide on the abdominal border and tapering somewhat to midway along the upper border.

Underside forewing : three small, evenly spaced costal spots of pale yellow ; indistinct marginal and submarginal bands of yellowish lunules ; a broad yellow band arising from the hind margin and coinciding with that on the upper surface. *Hindwing* : a broad yellow band corresponding with that on the upperside ; marginal and submarginal rows of heavily arched greyish lunules.

Holotype ♂ and allotype ♀ : REPUBLIC OF CONGO, Moyen Congo, Kelle, Feb. 1963 (*T. H. E. Jackson*) B.M. Type Nos. Rh. 16910, 16911.

Section E

Micropentila alberta (Staudinger)

(Text-fig. 24 ; pl. 3, figs. 86, 87, ♂)

Teriomima alberta Staudinger, 1891 : 220.

The figure in Seitz, **13**, pl. 62c, is not good.

♂. *Genital armature* : Text-fig. 24, upper border of *uncus* strongly excised ; *subunci* long, arched ; *vinculum* moderately broad, with a long, pointed *saccus* ; *valvae* oblong, the upper and lower processes divided near the apices ; *penis* robust, excised at its extremity.

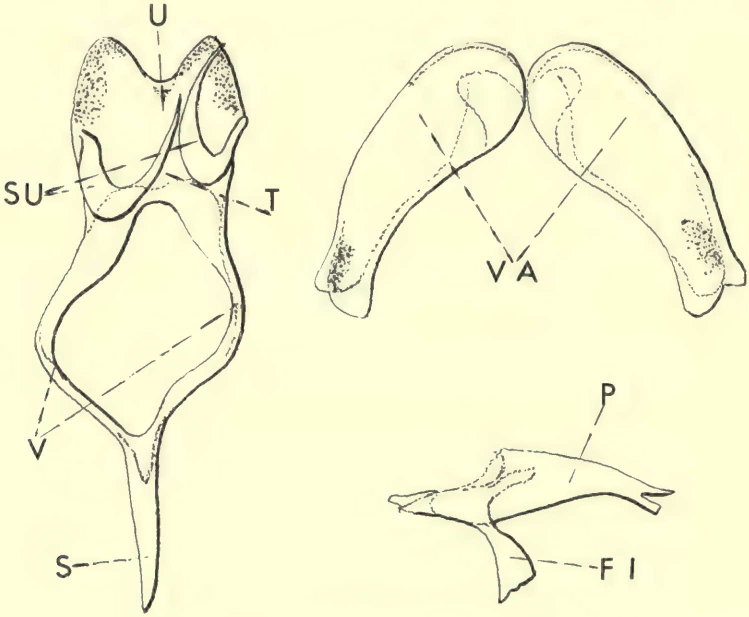

FIG. 24. *M. alberta* ♂, genitalia.

Habitat : GABOON, Ogowe.

Micropentila mabangi Baker

(Text-fig. 25 ; pl. 3, figs. 88, 89, ♂ HT)

Micropentila mabangi Baker, 1904 : 226.

♂. *Genital armature* : Text-fig. 25, upper border of *uncus* deeply excised ; *subunci* long, arched, narrow basally and distally, the middle section very slender ; valvae oblong, narrowed before the apex, which is directed outwards and rounded distally ; *penis* moderately thick, the dorsal border greatly dilated about the middle section.

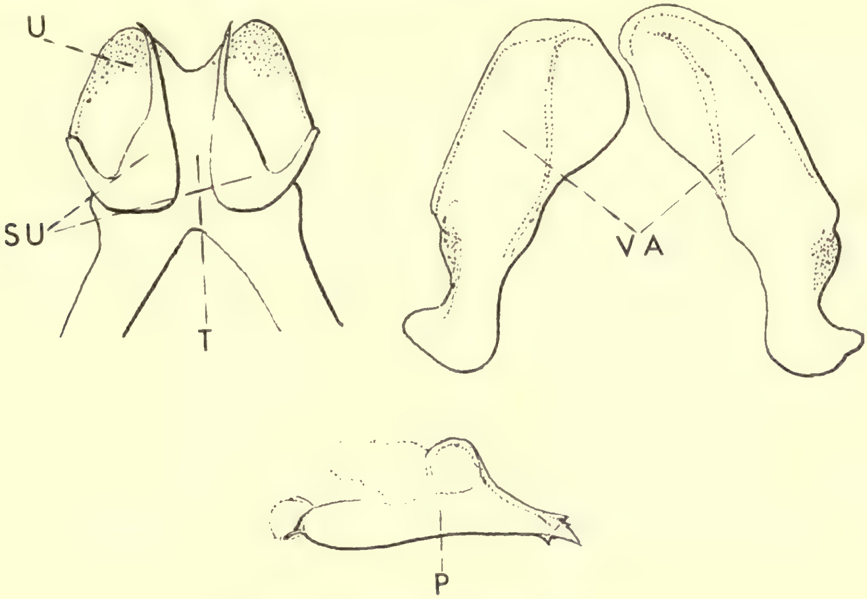

FIG. 25. *M. mabangi* ♂, genitalia.

Size : length of forewing, 12 mm., wings expanse, 24 mm.

♀. Unknown.

Habitat : SIERRA LEONE, Mabang.

Section F

Micropentila cingulum H. H. Druce

(Text-fig. 26 ; pl. 3, figs. 90, 91, ♂ neallotype)

Micropentila cingulum H. H. Druce, 1910 : 364.

Something odd appears in the original description, the author says that his type is a ♀ which does not differ from *alberta* on the upperside, but on the hindwing underside " carries a submarginal row of crescent-shaped lunules in place of a fine line ". We know the ♀ of *alberta* only by the figure in plate 62E of Seitz, but see no trace of a " fine line " in this figure. We think, therefore, that not only should the neallotype ♂ be described, but a more accurate re-description of the ♀ should be given.

♂. *Frons* black ; *palpi* furnished with erect greyish scales ; *antennal* shaft ringed black and white, club black, orange at the tip.

Upperside forewing : blackish brown with a greyish white postdiscal line, very thin and indistinct, sometimes obsolete. *Hindwing* : blackish brown, with a wide orange yellow stripe running from vein 6 to the abdominal border, where it is widened. Fringes black, lightly checkered with white.

Underside forewing : blackish brown with a narrow yellowish white postdiscal line ; anteterminal and submarginal lines of indistinct whitish lunules. *Hindwing* : blackish brown with a wide yellowish postdiscal stripe, extending unbroken from the costa to the abdominal border ; anteterminal and submarginal lines as on the forewing. Fringes as on the upperside.

Size : length of forewing, 11·5 mm., wings expanse, 20–22 mm.

♂. *Genital armature* : Text-fig. 26, *uncus* consisting of two lobes separated by a deep depression ; *subunci* rather short and thick, arched ; *tegumen* large ; *vinculum* narrow, with a triangular *saccus* ; *valvae* oblong, strongly constricted before the apices ; *penis* long and very thin, curved almost to a semicircle.

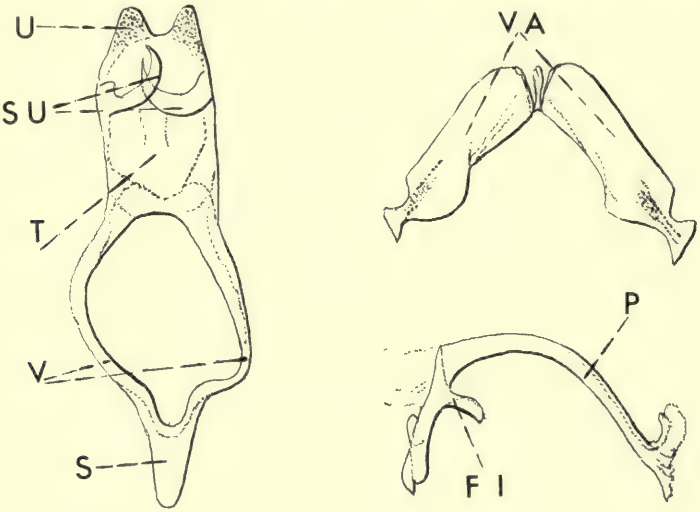

FIG. 26. *M. cingulum* ♂, genitalia.

♀. *Frons*, *palpi* and *antennae* as in ♂.

Upperside forewing : blackish brown with a yellow postdiscal stripe extending from the costa to the inner margin, this stripe being narrow at the costa and broadening towards the inner margin. *Hindwing* : blackish brown with a wide yellow stripe, varying in individuals, from the costa to the abdominal border. Fringes black, checkered white.

Underside forewing : blackish brown with a yellowish postdiscal stripe as on the upperside ; anteterminal and submarginal lines of whitish lunules, more distinct than in ♂. *Hindwing* : blackish brown with a yellowish postdiscal line, narrower than on the upperside ; anteterminal and submarginal lines as in the forewing. Fringes as on the upperside.

Size : length of forewing, 10·5 mm., wings expanse, 19–20 mm.

Holotype ♀ and neallotype ♂ in B.M. (N.H.) collection.

Habitat : SOUTH CAMEROONS, Bitje, Ja River ; GABOON, Lastoursville (*P. Rougeot*) ; REPUBLIC OF CONGO, Sembe ; Etoumbi ; Ouesso, Ketta Forest (*T. H. E. Jackson*) B.M. Type No. Rh. 16905.

Micropentila ugandae Hawker Smith **stat. n.**

(Text-fig. 27 ; pl. 3, figs. 92, 93, ♂, 94, 95, ♀)

Micropentila cingulum ugandae Hawker Smith, 1933 : 10.

This form was described by Hawker Smith from what was, at the time, a unique ♀. The recent discovery of the ♂ has, from genitalic examination, proved that he erred in describing it as a subspecies of *cingulum*. There are such obvious differences in the two armatures that *ugandae* must be rated as a distinct species, though by its penis shape it is placed in the same group as *cingulum*.

Neallotype ♂. *Frons* covered with blackish hair ; second joint of *palpi* furnished with long, black, erect hairs ; *antennal shaft* ringed with black and white, *club* black tipped with orange.

Wings upperside : blackish brown with pattern as follows : forewing : a very thin greyish white postdiscal line, arching towards the outer margin, paler, wider and clearly defined near the costa. Hindwing : postdiscal stripe vivid orange yellow, of an even width of about 1·5 mm., extending from the abdominal border to the vicinity of vein 6. Fringes checkered with black and white, with white predominating near the apex.

Wings underside : blackish brown with creamy-white pattern. Forewing : two minute dots along the costa, a thin postdiscal line, somewhat interrupted by the veins ; anteterminal and submarginal series of very faint lunules ; a whitish zone along the inner border. Hindwing : a few whitish scales in the basal zone ; a wide postdiscal stripe, orange yellow near the abdominal border and shading to pale yellow near the costa. Fringes as on the upperside.

Size : length of forewing, 11·5 mm., wings expanse, 21 mm.

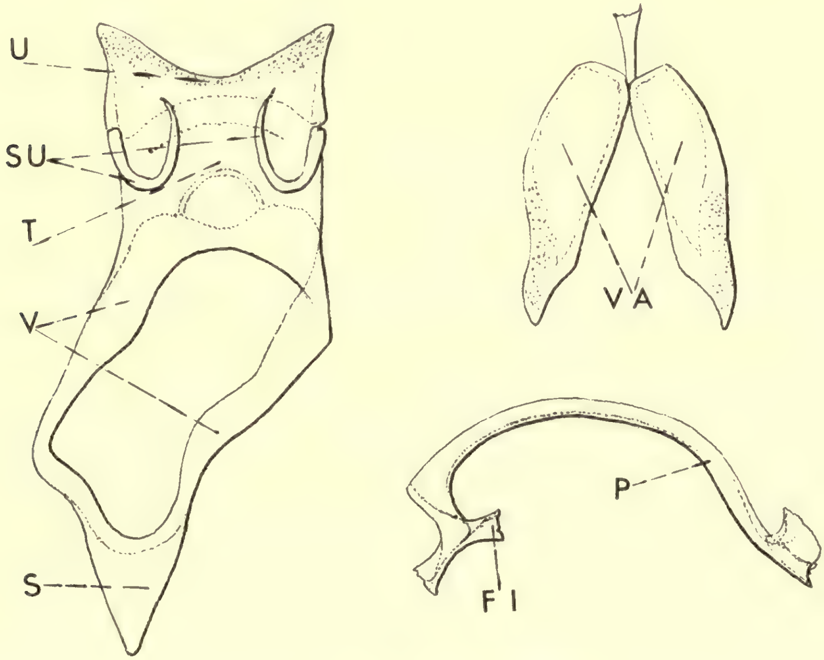

FIG. 27. *M. ugandae* ♂, genitalia.

♂. *Genital armature* : Text-fig. 27, *uncus* formed of two subtriangular lobes separated by a rounded depression ; *subunci* arched and very slender ; *tegumen* ample, rectangular ; *vinculum* moderately wide, with a triangular *saccus* ; *valvae* oblong, subtriangular ; *penis* long and very slender, strongly arched.

Holotype ♀ and neallotype ♂ in B.M. (N.H.) collection.

Neallotype ♂ : REPUBLIC OF CONGO, Ouesso, Ketta Forest, Dec. 1959 (*T. H. E. Jackson*) B.M. Type No. Rh. 16912.

Paratypes : REPUBLIC OF CONGO, Ouesso, Dec. 1959 (*T. H. E. Jackson*) 1 ♀ in B.M. (N.H.) coll. ; 4 ♂, 2 ♀, same data, in Stempffer collection ; 1 ♂, Etoumbi, Nov.–Dec. 1960 (*T. H. E. Jackson*) in Stempffer collection ; 1 ♂, CONGO, Uele, Paulis, Jan. 1958 (*Dr. M. Fontaine*) in Stempffer collection ; 2 ♂, same data, in Musée royal de l'Afrique Centrale, Tervuren ; 1 ♂, Stanleyville, in Coryndon Museum, Nairobi ; 1 ♂, S. CAMEROONS, Bitje in B.M. (N.H.) collection ; 2 ♂, 1 ♀, UGANDA, Unyoro, Budongo Forest (*T. H. E. Jackson*) in B.M. (N.H.) collection ; 1 ♂, 1 ♀, GABOON, Lastoursville (*P. Rougeot*) in Stempffer collection.

In the specimens from Paulis the postdiscal yellow stripe of the hindwing is slightly narrower than in the examples, from Republic of Congo and Gaboon, but the genitalia are identical.

Section G

***Micropentila sankuru* sp. n.**

(Text-fig. 28 ; pl. 3, figs. 96, 97, ♂, 98, 99, ♀)

♂. *Frons* furnished with black hair, with two lateral white lines ; second joint of the *palpi* black above, white underneath ; shaft of the *antennae* ringed with black and white, club black, orange tipped.

Wings upperside : black, with pure white spots disposed as follows : Forewing : a spot on the discoidals ; a triangular one below the origin of vein 2 ; a postdiscal series of three dots, one below the origin of vein 9, one between 7 and 6, a larger one between 4 and 3. Hindwing : one spot, very indistinct, on the discoidals, a postdiscal series of one indistinct dot near the costal border, one, fairly large, between 4 and 3, three very small between 3 and 1B, one, fairly large between 1B and the extremity of 1A. Fringes black, strongly checkered with white.

Wings underside : black, with pure white dots as follows : forewing : two dots in the cell : one on the discoidals ; five little dots along the costal border ; postdiscal series as on the upperside ; an anteterminal series of four dots from the costa to vein 4 ; a submarginal series from vein 7 to vein 2, the dot between veins 6 and 5 much larger than the others ; a greyish white area along the inner border. Hindwing : basal series of seven dots, one above the origin of vein 8, one between 8 and the upper border of the cell, two in the cell, two between the lower border of the cell and 1B, one between 1B and 1A ; a subbasal series of four dots, one above the origin of vein 7, one in the cell, one between 2 and 1B, one between 1B and 1A ; a little stria on the discoidals ; a postdiscal series comprising a big dot between the costal border and 7, a very irregular stripe between 6 and 2, widened between 6 and 3, little dots between 2 and the abdominal border ; an anteterminal series of very small dots between the apex and the anal angle ; a submarginal series of crescents from the apex to the anal angle, the one between the extremities of 6 and 5 much larger than the others. Fringes as on the upperside.

Size : length of forewing, 13 mm., wings expanse, 25 mm.

♂. *Genital armature* : Text-fig. 28, *uncus* crescent shaped with anterior border slightly excised ; *subunci* arched, fairly robust ; *tegumen* oval ; *vinculum* narrow with a pointed *saccus* ; *valvae* suboval with triangular apices ; *penis* long, slightly arched, the distal fourth strongly narrowed.

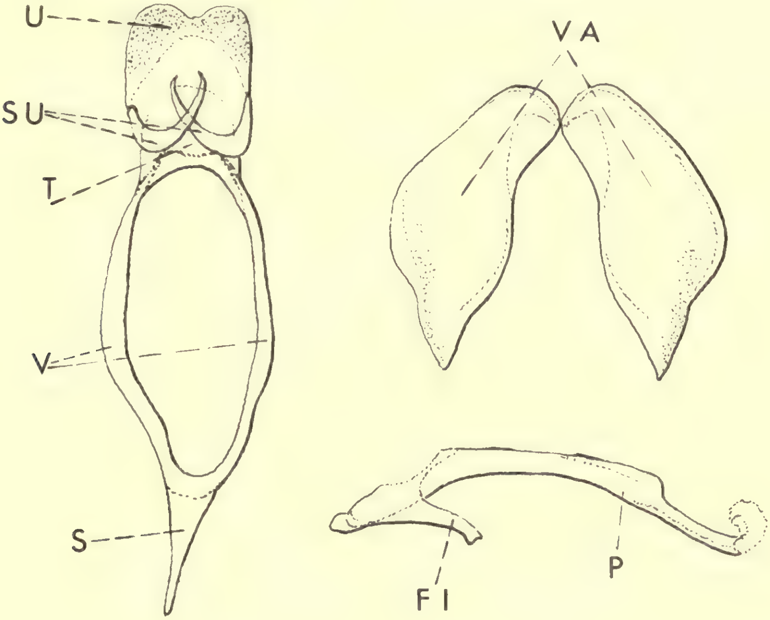

FIG. 28. *M. sankuru* ♂, genitalia.

♀. Differs little from ♂ in facies, but the submarginal white crescents of the underside hindwing are rather larger.

Size : length of forewing, 13 mm., wings expanse, 24 mm.

Holotype ♂ : CONGO, Sankuru, Katako Kombe, 3rd March, 1953 (*Dr. M. Fontaine*).

Allotype ♀ : same locality, 8th Feb. 1953 (*Dr. M. Fontaine*) both in the Musée royal de l'Afrique centrale, Tervuren, collection.

Paratypes : 2♂, same locality, 21st April 1953, 5th May, 1953 in Tervuren collection and Stempffer collection.

Section H

***Micropentila katangana* sp. n.**

(Text-fig. 29 ; pl. 3, figs. 100, 101, ♂)

♂. *Frons* clothed with long, erect hair ; second joint of *palpus* greatly compressed laterally, furnished with long whitish and brown scales ; *antennal shaft* ringed black and white, club blackish, orange tipped.

Upperside forewing : uniform blackish brown with only a small orange dot at the end of the cell. *Hindwing* : blackish brown with a large oval patch, vivid orange in the distal half ; this patch extends from the abdominal border up to a little beyond vein 5, its upper border nearly straight, its lower border concave ; it is prolonged along the abdominal border nearly up to the base of the wing. Fringes brown, checkered with white between the veins.

Wings underside : dark brown with the following designs : forewing : three small whitish dots along the costa ; a pale orange dot at the end of the cell ; pale orange postdiscal stria between 4 and 3 ; a double anteterminal series of small pale orange striae, irregular and indistinct.

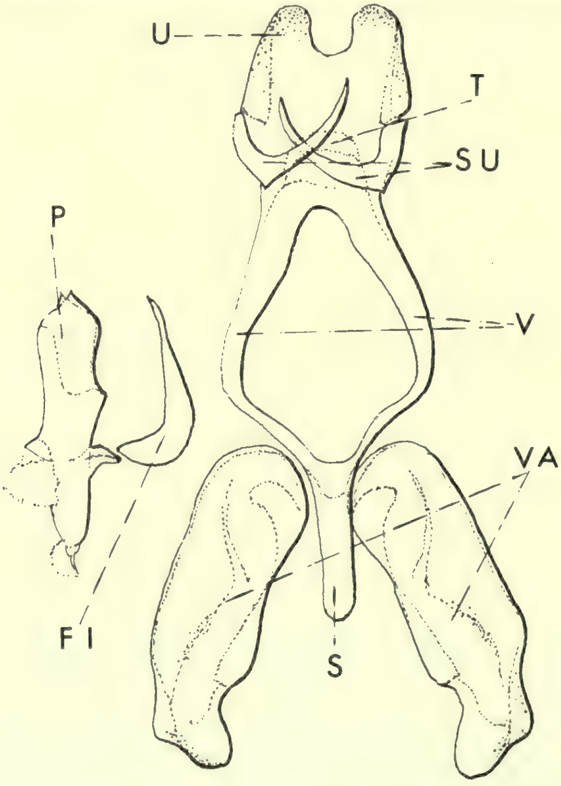

FIG. 29. *M. katangana* ♂, genitalia.

Hindwing : five basal and subbasal pale orange dots ; a little dot of the same colour on the discoidals ; a narrow postdiscal stripe, irregular, crossing the wing from the costa to 1B, this stripe composed of a rounded spot, yellowish white, between 8 and 7, a very narrow stria, also yellowish white, between 7 and 6, a fairly wide yellowish white stripe between 6 and 3, two pale orange striae between 3 and 2, 2 and 1B; between 1B and the abdominal border some light greyish scales. Fringes as on the upperside.

Size: length of forewing, 13·5 mm., wings expanse, 25 mm.

♂. *Genital armature*: Text-fig. 29, *uncus* bilobed, deeply excised at the anterior border; *subunci* long, arched, the lower border slightly angled; *vinculum* moderately wide, with a long, digitate *saccus*; *fultura inferior* blade shaped, arched; *valvae* oblong, subrectangular, the lower border excised before the rounded apex; *peuis* short, the terminal portion bulbous with two short obtuse points at the tip.

♀. Unknown.

Holotype ♂: CONGO, Katanga, Haut Lomani, Kafakumba, Feb. 1931. In Musée royal de l'Afrique centrale, Tervuren.

Micropentila cherereti sp. n.

(Text-fig. 30; pl. 3, figs. 102, 103, ♂; pl. 4, figs. 104, 105, ♀)

(Dedicated to one of T. H. E. Jackson's native collectors).

♂. Differs from *katangana* in the following details: *upperside forewing*: the tiny orange dot at the end of the cell is only visible with the aid of a microscope. *Hindwing*: the large orange patch reaches vein 6.

Underside forewing: all the clear patterns are slightly greyish white instead of pale yellow or yellowish white, so, they are much more distinct, especially the double anteterminal series of the forewing. *Hindwing*: the postdiscal line of the hindwing is also very clearly defined, distinctly wider, with an anteterminal series of fine white interneural striae; a series of white submarginal crescents.

Size: length of forewing, 12 mm., wings expanse, 22·5 mm.

♂. *Genital armature*: exactly as in *katangana*.

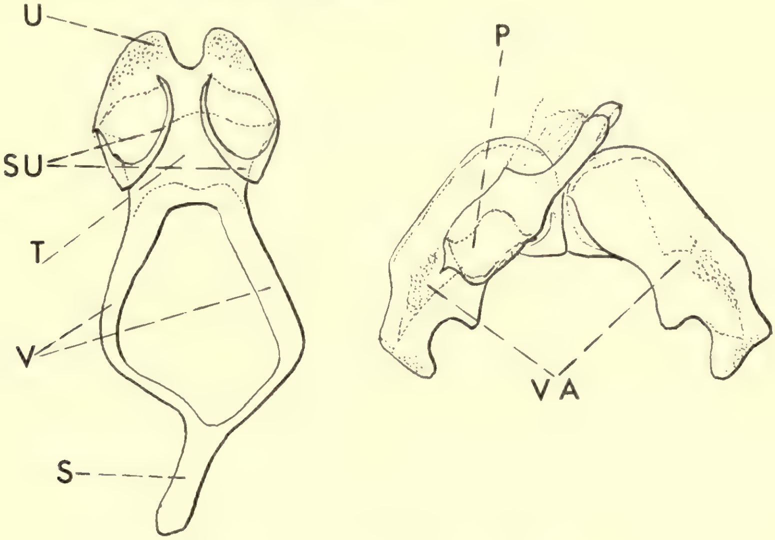

FIG. 30. *M. cherereti* ♂, genitalia.

♀. *Frons, palpi* and *antennae* as in ♂.

Wings upperside : blackish brown with orange yellow designs. Forewing : a line following the lower border of the cell ; two transverse striae in the cell, one on the discoidals, two between the lower border of the cell and vein 1, one spot between the costa and vein 6 ; a large oval one between veins 5 and 2. Hindwing : the orange postdiscal stripe greatly widened and reaching the costa at the extremity of vein 8, it extends over the greater area of the wing, the dark ground colour being reduced to a basal triangular spot with an irregular border and to a regular marginal border about 1 mm. wide. Fringes brown, checkered white.

Wings underside : blackish brown with pattern as follows : forewing : some white scaling along the costa ; two small white dots in the cell ; one on the discoidals ; one below the origin of vein 2 ; a postdiscal design composed of a white spot between the costa and vein 6, connected by a pale yellow stria to a large spot of the same colour running from vein 5 to vein 2 ; anteterminal and submarginal series of small interneural spots from the apex to vein 2. Hindwing : yellowish white scales along the base of the costa ; two basal and three subbasal yellowish dots ; an ill-defined transverse line running from the costa to 1B, yellowish towards the costa, then white ; postdiscal line wider than in ♂, of a slightly greyish white colour ; anteterminal continuous line of white crescents, submarginal white lunules. Fringes as on the upperside.

Size : length of forewing, 12·5 mm., wings expanse, 23 mm.

Holotype ♂ : UGANDA, Masaka, Katera, May, 1960 (*T. H. E. Jackson*) B.M. Type No. Rh. 16906.

Allotype ♀ : same locality, August, 1960 (*T. H. E. Jackson*) B.M. Type No. Rh. 16907.

Paratypes : 6 ♂, same locality (*T. H. E. Jackson*) all in B.M. (N.H.) collection.

Section I

***Micropentila bunyoro* sp. n.**

(Text-fig. 31 ; pl. 4, figs. 106, 107, ♂, 108, 109, ♀)

♂. *Frons* covered in black hair ; second joint of *palpus* furnished with long white and brown scales, third joint blackish ; *antennal shaft* ringed black and white, *club* black, tipped with yellowish orange.

Wings upperside : blackish brown. Forewing ; plain, no markings. Hindwing : wide yellowish orange postdiscal stripe running from the abdominal border to a little beyond vein 5, attached to which is an ill-defined yellow stria from vein 1B up to the middle of the cell. Fringes brown, checkered with white.

Wings underside : blackish brown with creamy white designs. Forewing : two small dots along the costa ; two more, indistinct, in the cell ; a fine postdiscal line from the costa to vein 3, interrupted between 6 and 5 ; two little subapical dots between 8 and 7, 7 and 6 ; a submarginal series of lunules, those between 7 and 6, 6 and 5, 4 and 3 larger than those between 8 and 7, 5 and 4 ; inner border greyish white. Hindwing : three subbasal dots, two near the costa ; a fine transverse stria running from the cell to 1B ; a wide postdiscal stripe, inner border almost unbroken, outer border very irregular, that part of the stripe between veins 6 and 3 being considerably widened ; small anteterminal patches between 8 and 7, 7 and 6 ; a series of submarginal lunules from the extremity of vein 7 to the anal angle, the one between 5 and 4 almost invisible. Fringes as on the upperside.

Size : length of forewing 12 mm., wings expanse 23 mm.

♂. *Genital armature* : Text-fig. 31, *uncus* like that of *katangana*, but the *subunci* are more slender ; *vinculum* rather narrow, with a long digitate *saccus*, slightly spatulate at the tip ; *valvae* oblong, subrectangular, the lower border deeply excised before the rounded apex ; *penis* short, the dorsal side of the inner part widely open, the external part short, wide, the tip deeply concave, crescent shaped ; *fultura inferior* blade shaped.

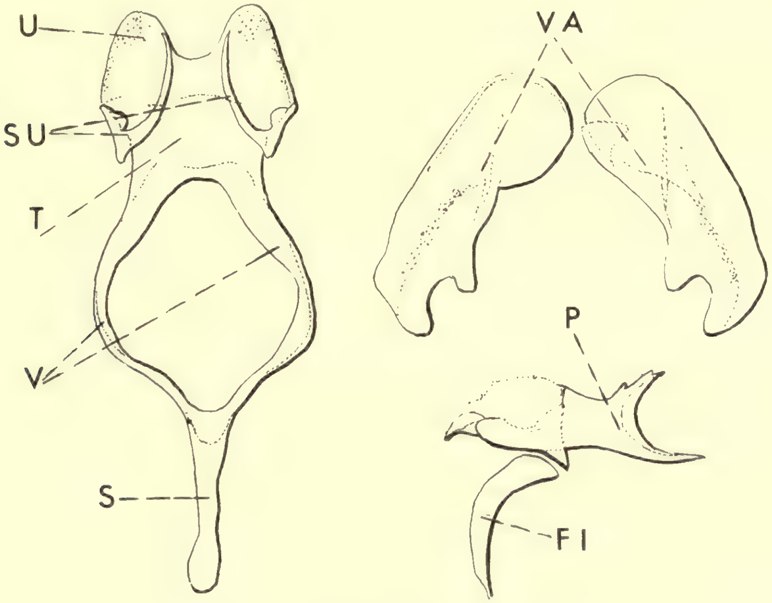

FIG. 31. *M. bunyoro* ♂, genitalia.

♀. *Wings upperside* : blackish brown with yellow designs. Forewing : two little dots in the cell, two more below the lower border of the cell ; a transverse irregular stripe running from vein 7 and approaching vein 1 ; costal patch from the costa to vein 6 ; large oval patch from vein 6 to vein 2. Hindwing : small subbasal spots, a postdiscal stripe running from the costa to the abdominal border, narrow from the costa to vein 6, then very wide.

Wings underside : blackish brown with designs as follows : forewing : small yellow dots in the cell ; two more below its lower border ; a square yellow patch on the discoidals, two small whitish dots along the costa ; a yellowish postdiscal stripe from the costa to the inner border, much narrowed between veins 6 and 5 ; antemarginal and marginal lines pale yellow. Hindwing : designs as in ♂, but clear yellow instead of creamy white.

Size : length of forewing, 12 mm., wings expanse, 23 mm.

Holotype ♂ and allotype ♀ : UGANDA, Unyoro, Budongo Forest (*T. H. E. Jackson*) B.M. Type Nos. Rh. 16908, 16909.

Paratypes : 4 ♂, same locality as types, Dec. 1958 (*T. H. E. Jackson*) in Stempffer collection ; 1 ♂, UGANDA, S. E. Buddu, Tero Forest, 3,800′, 26–30 Nov. 1911 (*S. A. Neave*), in B.M. (N.H.) collection ; 1 ♂, CONGO, N. Kivu, Mar. 1947 (*T. H. E. Jackson*) in B.M. (N.H.) collection.

A ♂ captured in the Budongo Forest in April, 1963, and now in the B.M. (N.H.), differs from other examples of this species in the marking of the forewing upperside, which bears a series of yellowish spots arranged as follows :—a small, poorly defined spot at the base ; another, more clearly marked, between 2 and 3, adjacent to the end of the cell ; a clearly defined, C-shaped mark at the end of the cell ; another clear spot midway between the end of the cell and the outer margin and lastly, a costal spot about two-thirds of the way from the base of the forewing. Despite this distinctive pattern, an examination of the genitalia revealed a typical *bunyoro* structure.

Species not examined.

M. triangularis Aurivillius 1895, *Ent. Tidskr.* **16** : 203. (According to information from the Stockholm Museum the type of this species was lost while in the care of Prof. A. Seitz during the First World War.)

M. catocata Strand, 1914, *Arch. Naturgesch.* **80** A2 : 155.

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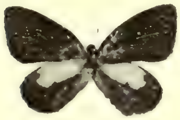
PLATE 1

FIGS. 32–35. Uppersides and undersides, respectively, of *Micropentila* : (32, 33) *souanke* Stempffer & Bennett, ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36203, 36204*) ; (34, 35) ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36205, 36206*) ; (36, 37) *fulvula* Hawker Smith, neallotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36207, 36208*) ; (38, 39) *adelgunda* Staudinger, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36065, 36064*) ; (40, 41) *bitjeana* Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 25107*) ; (42, 43) *dorothea* Baker, neallotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 25106*) ; (44, 45) *gabunica* Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 25104*) ; (46, 47) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 25105*) ; (48, 49) *victoriae* Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36208, 36209*) ; (50, 51) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 25116*) ; (52, 53) *katerae* Stempffer & Bennett, ♂ (*B.M.* (*N.H.*) *Neg. Nos. 25115*) ; (54, 55) ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36210, 36211*).

(Note. Figs. 38 and 39 are not at the same scale as the remainder)

PLATE 1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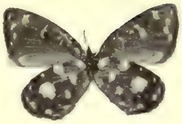
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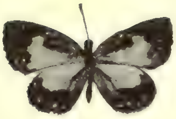
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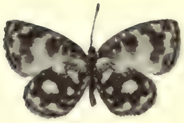
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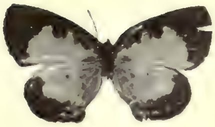
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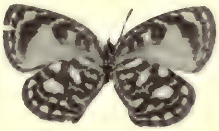
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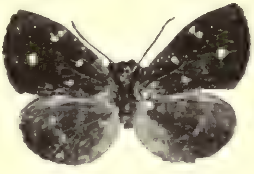
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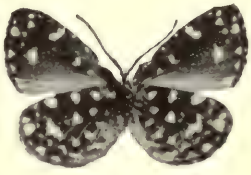
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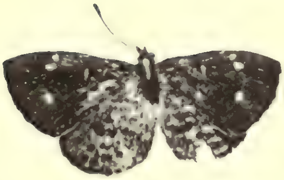
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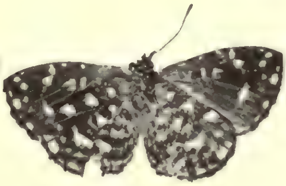
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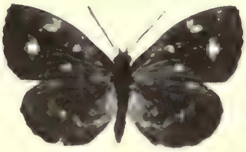
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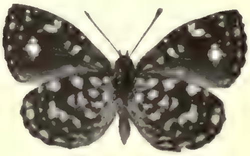
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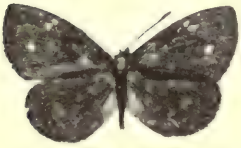
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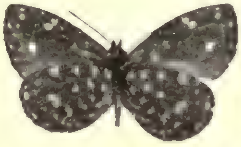
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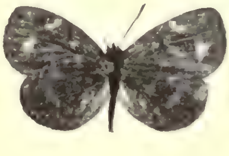
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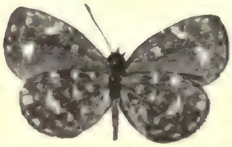
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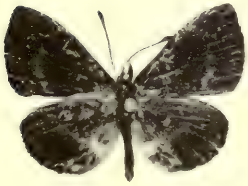
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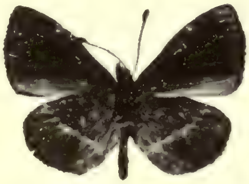
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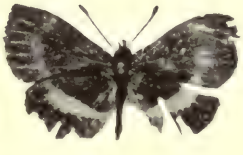
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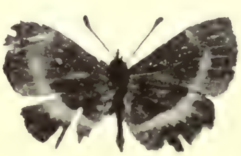
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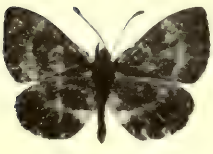
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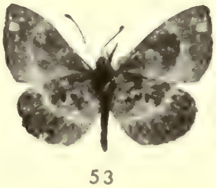
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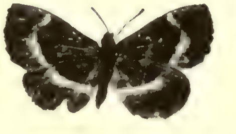
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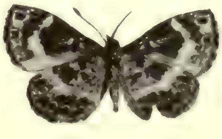
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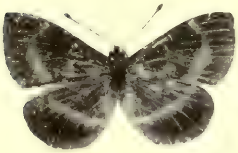
PLATE 2

FIGS. 56–79. Uppersides and undersides, respectively, of *Micropentila* : (56, 57) form?, Kigezi (*B.M.* (*N.H.*) *Neg. Nos. 36212, 36213*) ; (58, 59) *flavopunctata* Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36214, 36215*) ; (60, 61) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36216, 36217*) ; (62, 63) *bakotae* Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36218, 36219*) ; (64, 65) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36220, 36221*) ; (66, 67) *nigeriana* Stempffer & Bennett, (*B.M.* (*N.H.*) *Neg. Nos. 25109*) ; (68, 69) ♀ (*B.M.* (*N.H.*) *Neg. Nos. 25110*) ; (70, 71) *mpigi* Stempffer & Bennett, ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36222, 36223*) ; (72, 73) ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36224, 36225*) ; (74, 75) *fontainei* Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 33995, 33992*) ; (76, 77) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 33997, 34001*) ; (78, 79) *fuscula* Grose Smith neallotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 25114*).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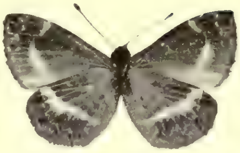
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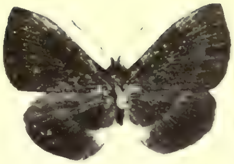
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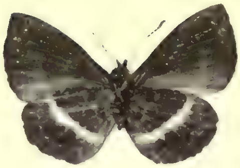
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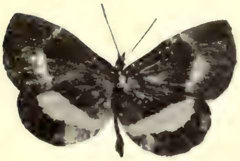
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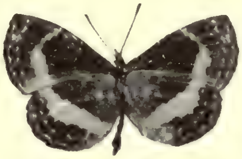
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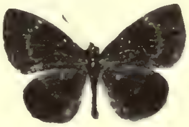
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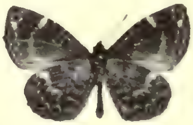
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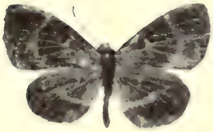
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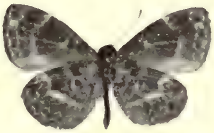
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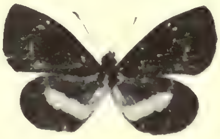
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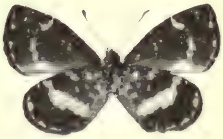
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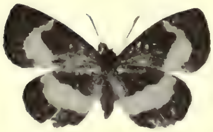
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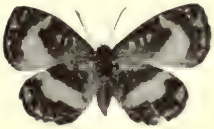
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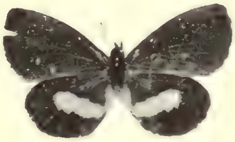
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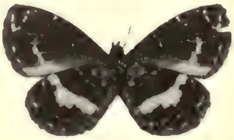
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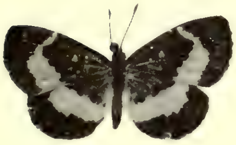
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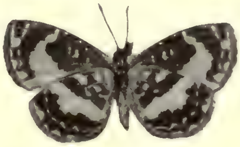
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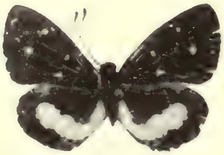
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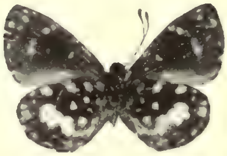
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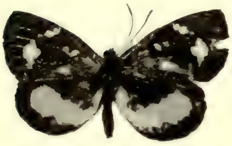
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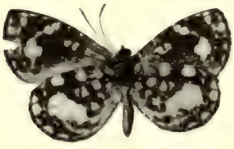
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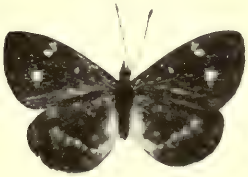
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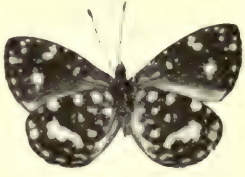
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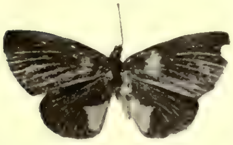
PLATE 3

FIGS. 80–103. Uppersides and undersides, respectively, of *Micropentila* : (80, 81) ***ogojae*** Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36226, 36227*) ; (82, 83) ***kelleana*** Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36228, 36229*) ; (84, 85) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36230, 36231*) ; (86, 87) ***alberta*** Staudinger, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36068, 36066*) ; (88, 89) ***mabangi*** Baker, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 25108*) ; (90, 91) ***cingulum*** H. H. Druce, neallotype ♂(*B.M.* (*N.H.*) *Neg. Nos. 25113*) ; (92, 93) ***ugandae*** Hawker Smith, neallotype ♂(*B.M.* (*N.H.*) *Neg. Nos. 25117*) ; (94, 95) ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36236, 36237*) ; (96, 97) ***sankuru*** Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 33993, 33994*) ; (98, 99) allotype ♀ (*B.M.* (*N.H.*) *Neg. Nos. 34000, 33999*) ; (100, 101) ***katangana*** Stempffer & Bennett, holotype ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36067, 36063*) ; (102, 103) ***chereveti*** Stempffer & Bennett, ♂ (*B.M.* (*N.H.*) *Neg. Nos. 36232, 36233*).

(Note. Figs. 86 and 87, 100 and 101, are not at the same scale as the remainder.)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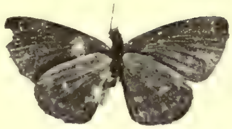
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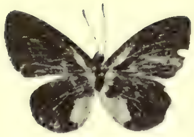
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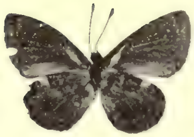
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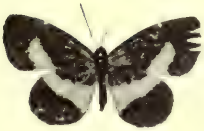
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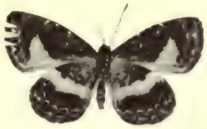
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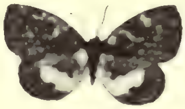
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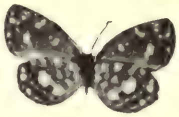
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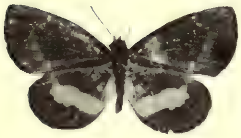
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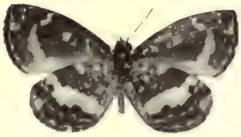
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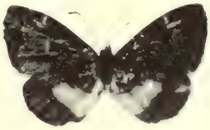
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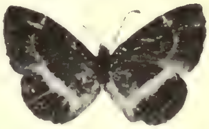
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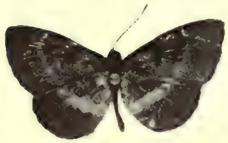
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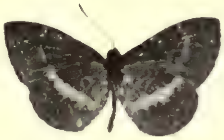
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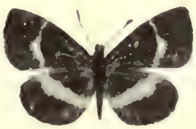
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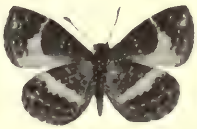
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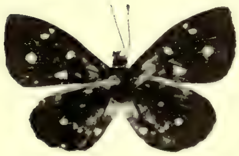
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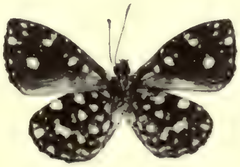
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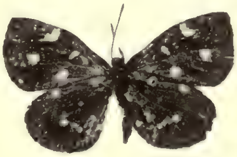
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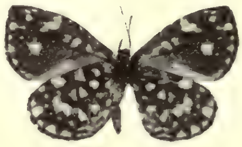
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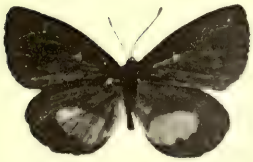
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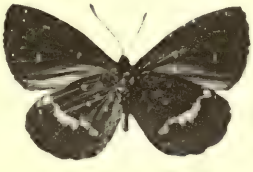
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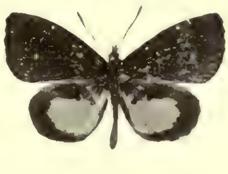
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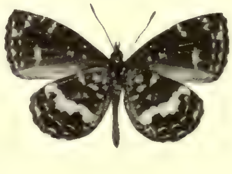
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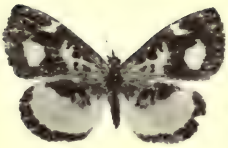
Figs. 104–109. Uppersides and undersides, respectively, of *Micropentila*: (104, 105) *chereretі* Stempffer & Bennett, ♀ (*B.M.* (*N.H.*) *Neg. Nos. 36234, 36235*); (106, 107) *bunyoro* Stempffer & Bennett, ♂ (*B.M.* (*N.H.*) *Neg. Nos. 25111*); (108, 109) ♀(*B.M.* (*N.H.*) *Neg. Nos. 25112*).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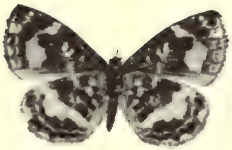
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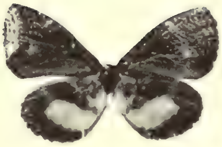
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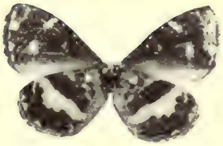
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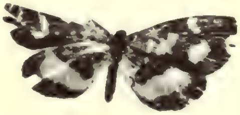
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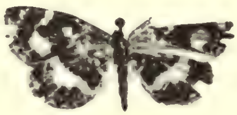
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